Waste Transfer Station, Daventry
Flood Risk Assessment and Drainage Strategy

On behalf of Daventry District Council
Document Control Sheet

Project Name: Waste Transfer Station, Daventry
Project Ref: 41903
Report Title: Flood Risk Assessment and Drainage Strategy
Doc Ref: 41903/FRA
Date: February 2018

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<td>A</td>
<td>21.11.17</td>
<td>Updated to take into account foul sewer drainage survey and Anglian Water consultation</td>
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<td>B</td>
<td>09.02.18</td>
<td>Updated to take into account finalised site plan and discussions held with Anglian Water</td>
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Executive Summary

This Flood Risk Assessment (FRA) has been prepared by Peter Brett Associates LLP (PBA) to support a planning application for the redevelopment of High March Waste Transfer Station at Daventry.

In accordance with the fundamental objectives of the National Planning Policy Framework (NPPF), the FRA demonstrates that:

(i) The development is safe;

(ii) The development does not increase flood risk; and,

(iii) The development does not detrimentally affect third parties.

The Environment Agency (EA) Flood Zone map shows the site lies within Flood Zone 1 ‘Low Probability’ (as defined in NPPF Planning Practice Guidance (PPG) ‘Flood Risk and Coastal Change’ Table 1) as follows:

Flood Zone 1 ‘Low Probability’ (less than 1 in 1000 (0.1%) annual probability of river or sea flooding

The proposals for sites used for waste management facilities for hazardous waste constitute a More Vulnerable land use, which is considered appropriate within Flood Zone 1 (reference NPPF PPG Tables 2 and 3).

The proposed surface water drainage strategy for the development consists of a geocellular storage tank with an outlet control to the onsite surface water sewer, and results in a reduction in peak runoff rates discharging from the site.

Flow from the wash-down area will drain to the existing foul sewer in the south-west of the site.

In summary, the FRA demonstrates that the proposed development is safe and in accordance with the requirements of national and local planning policy.
1 Introduction

1.1 Scope of Report

1.1.1 This Flood Risk Assessment (FRA) has been prepared by Peter Brett Associates LLP (PBA), on behalf of our client, Daventry District Council, to support a planning application for High March Waste Transfer Station at Daventry.

1.1.2 The report is based on the available flood risk information for the site as detailed in Section 1.2, and prepared in accordance with the planning policy requirements set out in Section 1.3. The scope of the FRA is consistent with the ‘Site-specific Flood Risk Assessment Checklist’ from the National Planning Policy Framework (NPPF) Planning Practice Guidance:


1.1.3 The required content of the checklist is detailed below along with specific cross-reference to the content in the FRA as follows:

1) Development site and location – see Section 2;
2) Development proposals – see Section 4;
3) Sequential Test – see Section 4;
4) Site-specific flood risk – see Section 3;
5) Surface water management – see Section 6;
6) Occupants and users of the development – see Section 4;
7) Exception Test – see Section 4;
8) Residual Risk – see Section 7;
9) Flood risk assessment credentials – PBA has many years of experience in, amongst other areas, the assessment of flood risk, hydrology, flood defence and river engineering. The authors and reviewers of the document are all experienced engineers and members of chartered institutions such as the Chartered Institution of Water and Environmental Management (CIWEM) or the Institution of Civil Engineers (ICE).

1.2 Sources of Information

1.2.1 The FRA has been prepared based on the following sources of flood risk information:

- EA online flood maps (website);
- EA Product 4 data (See Appendix D);
- Northamptonshire County Council Preliminary Flood Risk Assessment (PFRA);
- The Level 1 West Northamptonshire Strategic Flood Risk Assessment (SFRA), prepared by Scott Wilson dated February 2009;
- River Nene Catchment Flood Management Plan (CFMP) (December 2009);
1.3 Policy Context

1.3.1 This FRA has been prepared in accordance with the relevant national, regional and local planning policy and statutory authority guidance as follows:

- National policy contained within the National Planning Policy Framework (NPPF) dated March 2012, issued by Communities and Local Government, with reference to Section 10 ‘Meeting the challenge of climate change, flooding and coastal change’;
- The NPPF Planning Practice Guidance (PPG) released in March 2014 (‘Flood Risk and Coastal Change’ section);
- Local planning policy contained within the West Northamptonshire Joint Core Strategy Local Plan (adopted December 2014), with particular reference to policies BN7A – Water supply, quality and wastewater infrastructure and BN7- Flood Risk (see extract in Appendix E);

1.4 Caveats and Exclusions

1.4.1 This FRA has been prepared in accordance with the NPPF and Local Planning Policy. The proposed flood management (including ground floor level recommendations) and surface water management strategies are based on the relevant British Standards (BS8533), the standing advice provided by the EA or based on common practice.

1.4.2 The revised Construction (Design and Management) Regulations 2015 (CDM Regulations) came into force on April 2015 to update certain duties on all parties involved in a construction project, including those promoting the development. One of the designer’s responsibilities is to ensure that the client organisation, in this instance Daventry District Council, is made aware of their duties under the CDM Regulations. For further information on the CDM Regulations is provided in the client guide available at [http://www.hse.gov.uk/pubns/indg411.pdf](http://www.hse.gov.uk/pubns/indg411.pdf)

1.4.3 The approach for the FRA and proposals for the surface water management strategy are based on the requirements of the EA and Northamptonshire County Council in its role as Lead Local Flood Authority (LLFA).

1.4.4 It should be noted that the insurance market applies its own tests to properties in terms of determining premiums and the insurability of properties for flood risk. Those undertaking development in areas which may be at risk of flooding are advised to contact their insurers or the Association of British Insurers (ABI) to seek further guidance prior to commencing development.

1.4.5 The EA Product 4 flood data on which the FRA is based is valid under a 12 month licence. As such, the FRA is accurate at time of issue but we would recommend the end user reviews the validity of the flood data on an annual basis with the EA.

1.4.6 PBA do not warrant that the advice in this report will guarantee the availability of flood insurance either now or in the future.

The findings of this FRA are based on data available at the time of the study and on the subsequent assessment that has been undertaken to date. They relate to current development proposals as outlined in Section 4. PBA does not warrant that the advice in this report will guarantee the availability of flood insurance either now or in the future.
2 Site Setting

2.1 Site Description

2.1.1 The 0.485 hectare (ha) site is located at High March in the town of Daventry in Northamptonshire County (postcode NN11 4EZ, site centre National Grid Reference 458108E, 261699N). The site location is indicated in Figure 2.1.

2.1.2 The town of Daventry lies within the administrative boundary of Daventry District Council (DDC).

2.2 Topography

2.2.1 The site generally falls in a north-westerly direction with levels ranging from 155.57-157.50m AOD. The centre of the site is approximately 156.0m AOD. The site access from High March is approximately 156.50m AOD. A copy of the topographical survey is included in Appendix A.

2.3 Hydrological Setting

2.3.1 The site is located within the River Nene Catchment. The River Nene (classified as a EA main river) is located approx. 2.5km south of the site. There is an ordinary watercourse approximately 420m south east of the site which flows eastwards to the Whilton Branch Main.
River. NCC confirmed the ownership and maintenance responsibilities are shared by the landowners on either side of the watercourse. Daventry Reservoir is located approximately 1.75km north of the site.

2.4  Existing Drainage Arrangements

On-Site Drainage

2.4.1 A survey of existing services within the site was completed by JJP Consulting in March 2017. A copy of the survey plan is included in Appendix A. This indicates that all surface water drainage on site discharges eastwards to a 225mm diameter foul drain which runs parallel to the eastern boundary of the site. The existing connection to the foul sewer is assumed to be due to the nature of the site (risk of surface water runoff becoming contaminated before entering drainage system). There are two oil interceptors in the northern part of the site to separate fuel and oil from surface water to minimise the risk of polluted water leaving the site. Foul drainage from the main building on site also discharges to the aforementioned foul drain.

2.4.2 The site is considered to be 100% impermeable.

Public Sewers

2.4.3 Anglian Water has provided copies of its sewerage infrastructure plans for the site and surrounding area. A copy of the sewer asset plans is provided in Appendix B.

2.4.4 There is a 225mm public foul water sewer which runs parallel to the eastern boundary within the site, as mentioned in section 2.4.2. There is a 450mm sewer which cuts across the south-west corner of the site. The 450mm sewer conveys foul water northwards towards the roundabout. There is a 300mm surface water sewer within the site which runs parallel to the eastern site boundary.

2.5  Geology and Hydrogeology

2.5.1 British Geological Survey (BGS) extracts showing the indicative site geology are included in Appendix C. The whole site is shown to be underlain by the Whitby Mudstone Formation. No superficial deposits are shown to be present.

2.5.2 A ground investigation has been carried out on site. Five borehole logs contained in Appendix C reveal the presence of Made Ground up to 3m below ground level (bgl) with Clay underlying this layer. The Made Ground typically comprises sandy clay with brick, wood fragments, plastic membrane, and coal present in some of the boreholes. Groundwater seepage was encountered in Borehole No:4 at 1.2mbgl within the clay layer. Slow inflow was encountered at 0.30mbgl within Made Ground.

2.5.3 The EA Groundwater maps show that the site is not located within a Source Protection Zone. The EA maps also show the site is not underlain by a Bedrock aquifer. An extract from the EA maps is shown in Figure 2.2.
Figure 2.2: EA Source Protection Zones
3 Overview of Flood Risk

3.1 EA Flood Maps

Flood Zone Map

3.1.1 The first phase in identifying whether a site is potentially at risk of flooding is to consult the EA’s Flood Zone maps, available on the EA’s website. This provides an initial indication of the extent of the Flood Zones, which is refined by the use of more detailed site-specific level survey and modelled flood levels.

3.1.2 The EA Flood Map for planning enclosed in Appendix D indicates the site lies within Flood Zone 1 ‘Low Probability’ (less than 1 in 1000 (0.1%) annual probability) of river flooding.

Flood Risk from Reservoirs Map

3.1.3 The EA provide maps showing the risk of flooding in the event of a breach from reservoirs, based only on large reservoirs (over 25,000 cubic metres of water). The EA maps show the site is not at risk of flooding from reservoir breach.

3.1.4 It should be emphasised that the risk of flooding from reservoir breach is very small in any case; the EA are the enforcement authority for the Reservoirs Act (1975) and all large raised reservoirs are inspected and supervised by reservoir panel engineers. As stated on the EA’s website:

‘Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, we ensure that reservoirs are inspected regularly and essential safety work is carried out’.

3.1.5 The risk of such an occurrence is therefore considered negligible.

Flood Risk from Surface Water

3.1.6 The EA ‘Surface Water Flood Risk Map’ shows where areas could be potentially susceptible to surface water flooding in an extreme rainfall event.

3.1.7 The online EA surface water flood map is shown in Figure 3.1 below. The map indicates that the majority of the site is at a ‘very low’ risk of surface water flooding. There is a small area located in the centre of the site which is shown to be at ‘low’ risk of flooding. DDC has no surface water records of flooding for the site (see response in Appendix E).
3.1.8 The EA definitions for each surface water flood risk category is defined in Table 3.1 below:

<table>
<thead>
<tr>
<th>Risk of flooding</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>&lt; 1 in 1000 (0.1%)</td>
</tr>
<tr>
<td>Low</td>
<td>1 in 1000 (0.1%) - 1 in 100 (1%)</td>
</tr>
<tr>
<td>Medium</td>
<td>1 in 100 (1%) - 1 in 30 (3.3%)</td>
</tr>
<tr>
<td>High</td>
<td>&gt; 1 in 30 (3.3%)</td>
</tr>
</tbody>
</table>

3.1.9 It should be noted that the surface water maps are generated using a generic methodology on a national scale, whereby rainfall is routed over a ground surface model. The analysis does not take account of any specific local information on below-ground drainage infrastructure and infiltration, although an adjustment is included in urban areas to account for the impact of sewerage and a standard infiltration allowance based on soil type. Consequently, the mapping provides a guide to potentially vulnerable areas based on the general topography of an area.

3.1.10 Review of topographical survey data suggests that the localised area of ‘low’ risk from surface water flooding is likely to be associated with a localised depression in the topography on site. The survey also confirms the presence of drainage features in this area which would be expected to further reduce any risk of flooding in this location. On the basis that appropriate surface water drainage systems are to be retained as part of the development, the risk from surface water flooding is likely to be negligible.
3.2 **Anglian Water Flood Data**

**Flood Risk from Sewers**

3.2.1 Anglian Water has confirmed that there have been no instances of sewer flooding within the vicinity of the proposed development (see response in Appendix B).

3.3 **LLFA Flood Data**

**Flood Risk from Groundwater**

3.3.1 *Figure 3.2* shows an extract of the Northamptonshire Ground Water Flood Risk Map, as provided by the LLFA. The map suggests the site is within an area considered to be at ‘very low’ risk of flooding. The ‘very low’ classification is defined as “there is a remote possibility that groundwater flooding may be experienced at, or near this location with an indicative >1% annual probability”.

![Figure 3.1: Extract from Northamptonshire Groundwater Flood Risk Map](image)

3.3.2 NCC confirmed that they have no records of flooding affecting the site itself (see correspondence in Appendix E). There have been two incidents of localised flooding due to drainage issues within 500m of the site, in Vernon Close and Keys Close, both north of the site beyond the roundabout.

3.4 **Strategic Flood Risk Assessment**

3.4.1 The SFRA suggests the site is within an area affected by sewer flooding (see extract in Appendix F). However recent correspondence with Anglian Water indicates this is not an issue.

3.5 **Summary of Flood Risk**

3.5.1 The following table provides an overview of the flood risk to the site, based on the information obtained and detailed in Section 3.
### Table 3.2: Summary of Sources of Flood Risk

<table>
<thead>
<tr>
<th>Source of Flooding</th>
<th>Risk of Flooding to Site</th>
<th>Comment/Justification</th>
<th>Source of data</th>
<th>Mitigation requirements for new development (see Section 5)</th>
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<tr>
<td>Tidal</td>
<td></td>
<td>The closest main-river watercourse is not tidal influenced.</td>
<td>EA Data (see Section 3.1)</td>
<td>None</td>
</tr>
<tr>
<td>Fluvial</td>
<td></td>
<td>The site outside 1 in 1000 annual probability fluvial floodplain (closest Main River watercourse is the River Nene). There are no historic records of fluvial flooding at the site.</td>
<td>EA flood map for planning (see Section 3.1)</td>
<td>None</td>
</tr>
<tr>
<td>Land Drainage (i.e. Surface Water/Pluvial)</td>
<td></td>
<td>The majority of the site is at a very low risk of surface water flooding.</td>
<td>EA surface water flood maps (see Section 3.1)</td>
<td>None</td>
</tr>
<tr>
<td>Ground water</td>
<td></td>
<td>Information provided by NCC suggests the site is at a very low risk of groundwater flooding. The site is 100% impermeable.</td>
<td>LLFA data (see Section 3.3) Geo investigations (see Section 2.5) BGS Viewer (see Section 2.5)</td>
<td>None</td>
</tr>
<tr>
<td>Reservoir, Canals, Ponds and Other Artificial Sources</td>
<td></td>
<td>There are no artificial water based structures in close proximity to the site.</td>
<td>Information provided by the LLFA (see Section 3.3)</td>
<td>None</td>
</tr>
<tr>
<td>Sewers</td>
<td></td>
<td>There are public sewers which cross the site. However Anglian Water have confirmed they have no records of flooding within the vicinity of the site.</td>
<td>SFRA (see Section 3.3) Anglian Water records (see Section 3.2)</td>
<td>None</td>
</tr>
</tbody>
</table>

**Key:**
- **Low/Negligible Risk** – No noticeable impact to site and not considered to be a constraint to development
- **Medium Risk** – Issue requires consideration but not a significant constraint to development
- **High Risk** – Major constraint to development requiring active consideration in mitigation proposals
4 Proposed Development and Sequential Test

4.1 Proposed Development

4.1.1 This FRA accompanies a detailed planning application for:

The redevelopment of the existing waste transfer station and yard. Two new structures are proposed with a two bay workshop and new Waste Transfer Station building. In addition, a wash down area is proposed in the south-west corner of the site.

4.1.2 A proposed development plan is enclosed in Appendix G.

4.2 Flood Risk Vulnerability

4.2.1 NPPF PPG ‘Flood Risk and Coastal Change’ Table 2 confirms the ‘Flood risk vulnerability classification’ of a site, depending upon the proposed usage. This classification is subsequently applied to PPG Table 3 to determine whether:

- The proposed development is suitable for the flood zone in which it is located, and;
- Whether an Exception Test is required for the proposed development.

4.2.2 The proposed residential development is classed as ‘more vulnerable’ development.

4.2.3 The location of the proposed ‘more vulnerable’ development is in Flood Zone 1.

4.3 NPPF Sequential Test

4.3.1 The NPPF follows a sequential risk-based approach in determining the suitability of land for development in flood risk areas, with the intention of steering all new development to the lowest flood risk areas. The sequential test is considered to be passed on the basis that the site is wholly located in Flood Zone 1.

4.4 NPPF Exception Test

4.4.1 With reference to Table 3 of the NPPF PPG it can be seen that ‘more vulnerable’ development in Flood Zone 1 is considered appropriate without a requirement to consider the Exception Test.
5 Flood Mitigation Strategy

5.1 Sequential Approach

5.1.1 The NPPF encourages the application of the ‘sequential approach’ in the master-planning process for new development, i.e. locating the more sensitive/vulnerable elements of new development in the areas which lie at lowest probability of flooding and, conversely, reserve the areas of the site at greatest risk of flooding for the least vulnerable elements of the development (or, preferably, leave such areas undeveloped or as soft landscaping).

5.1.2 Although flood risk to the site has been determined to be low, the sequential approach has been carried out on a site specific basis as the proposed buildings are located in part of the site where surface water flooding is considered to be at ‘very low’ risk.

5.2 Building Design

Ground Floor Levels

5.2.1 It is recommended that ground floor levels are set a suitable freeboard above surrounding ground (minimum 150mm) to mitigate the residual flood risk associated with excess surface water runoff in an extreme rainfall event.

Exterior Levels

5.2.2 Similarly, exterior ground levels across the site should also be appropriately contoured to direct surface water away from buildings in such a scenario.

5.3 Designing for Exceedance

5.3.1 Site levels will be set such that when there is an exceedance event (events in excess of the 1 in 200 year rainfall event including a climate change of 40% - see further discussion in Section 6), surface water runoff will be directed away from onsite buildings and access into the site.
6 Surface Water and SuDS

6.1 Overview

6.1.1 As of April 2015, the Lead Local Flood Authority (LLFA) has become a statutory consultee on planning applications for surface water management. As the LLFA, Northamptonshire County Council are therefore responsible for the approval of surface water drainage systems within new major development. Major development consists of any of the following:

a) the provision of dwelling houses where residential development of 10 or more units; or where the development is to be carried out on a site having an area of 0.5 hectares or more and the number of units is not known;

b) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or

c) development carried out on a site having an area of 1 hectare or more.

6.1.2 The following section provides an overview of the existing surface water drainage arrangements and the proposed strategy for the management of surface water from the new development. Further details are provided in the PBA Drawing in Appendix I.

6.2 Planning Policy Requirements

6.2.1 The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface runoff from development sites, and recommends that priority is given to the use of Sustainable Drainage Systems (SuDS) in new development, this being complementary to the control of development within the floodplain.

6.2.2 As the intention of SuDS is to mimic the natural drainage regime of the undeveloped site, the NPPF PPG states the following (consistent with the Building Regulations H3 hierarchy):

...the aim should be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:
- into the ground (infiltration),
- to a surface water body,
- to a surface water sewer, highway drain or another drainage system,
- to a combined sewer

6.2.3 The key design criteria for aspects of the surface water drainage system are detailed in the DEFRA ‘Non statutory technical standards for sustainable drainage systems’.

6.2.4 Policy BN7A – Water supply, quality and wastewater infrastructure contained within the West Northamptonshire Joint Core Strategy Local Plan mentions that development should use sustainable drainage systems, wherever practicable, to improve water quality, reduce flood risk and provide environmental and adaptation benefits.

6.2.5 The LLFA document ‘Local Standards and Guidance for Surface Water Drainage in Northamptonshire’ (August 2016 – Updated September 2017) provides further guidance on local standards and expectations for the management of surface water in new development.
6.2.6 In particular, it should be noted that all development in the Upper Nene catchment must be designed for a 1 in 200 year (0.5% annual probability) flood event, including an appropriate allowance for climate change. This includes the design of any surface water attenuation. This policy is set out in the Northamptonshire Local Flood Risk Management Strategy and further reinforced in the West Northamptonshire SFRA Level 1.

**Consideration of Infiltration Drainage**

6.2.7 Based on the aforementioned hierarchy, the preferred method for disposal of surface water from a site is via infiltration drainage.

6.2.8 The site is underlain by Made Ground up to 3mbgl with Clay below (see borehole logs in Appendix C). Due to the nature of the site there is also an elevated risk of mobilising pollutants if infiltrating into the Made Ground. Infiltration is not therefore considered viable.

6.2.9 Confirmation is being sought from NCC that soakaway testing is not required to support the drainage strategy.

**Consideration of Discharge to Watercourse**

6.2.10 Where infiltration is not appropriate, the next preference in the Building Regulations H3 Hierarchy is discharge to a watercourse.

6.2.11 The nearest watercourse is located approximately 420m south east of the site. It is not considered to be practicable to discharge to this watercourse and similar concerns with the risk of contamination would apply.

**Consideration of Discharge to Sewer**

6.2.12 Where discharge via infiltration or watercourse is not appropriate, the final preference is discharge to a sewer.

6.2.13 A pre-development enquiry was submitted to Anglian Water to gain approval of discharge rate and connection point for the proposed development. Their initial response is enclosed in Appendix B. The pre-planning assessment report states that connection to the foul sewer is acceptable. PBA confirmed to Anglian Water that a pumped connection to the foul sewer is not necessary due to the depth of the receiving foul sewer and appraisal of the pollution risks has identified that some low risk areas (yard area) can discharge to the surface water sewer with appropriate mitigation. Further consultation with Anglian Water confirmed a gravity connection could be made to Surface Water Manhole Ref 1751 in the verge adjacent to the site entrance at a restricted rate of 13l/s (see correspondence enclosed in Appendix B). High risk areas such as the wash down area will discharge to the foul sewer.

6.3 **Design Criteria**

6.3.1 The surface water drainage strategy has been developed based on the following key design criteria:

- A minimum 40% betterment in rates on all rates for all events up to and including the 1 in 200 year including an allowance for climate change of 40% as required by NCC (see correspondence in Appendix E). Using Microdrainage Software the existing 1 in 1 year discharge rate is calculated to be 40.3l/s (see calculations in Appendix H). It was initially proposed to restrict all runoff up to the critical storm event to the calculated 1 in 1 year rate with 40% betterment which equates to a limited flow of 24.2l/s. Anglian Water however confirmed that the discharge rate needs to be restricted to 13l/s to make a connection to the public surface water sewer. It is therefore proposed that peak runoff rates are restricted to 13l/s. This is a 68% betterment on the existing 1 in 1 year rate.
6.4 Outline Surface Water Drainage Strategy

6.4.1 The detailed surface water drainage design will be developed at the detailed design stage with consideration of the above. For the purposes of the FRA an outline strategy has been developed to demonstrate it is feasible for the site to meet requirements in relation to attenuation of clean surface water runoff. It is assumed that the whole site is 100% impermeable with a section of the existing drainage infrastructure to be retained.

6.4.2 The surface water drainage strategy has been developed by PBA and can be summarised as follows:

6.4.3 The proposed surface water drainage strategy is to discharge flows from low contamination risk areas to the existing onsite surface water sewer at a maximum rate of 13 l/s, as agreed with Anglian Water. The required on site storage will be provided by geocellular storage two metres deep in the north-east part of the site. A vortex flow control device is proposed at the downstream end of the structure to restrict flow from the development to 13 l/s.

6.4.4 Micro Drainage has been used to model the outline surface water drainage strategy and evaluate the performance for rainfall events up to the 1 in 200 year event plus an additional allowance of 40% on rainfall intensity to account for the potential impacts of climate change. A copy of the calculations is included in Appendix H.

6.4.5 The Micro Drainage model confirms no surcharging occurs within the system during the 1 in 2 year and no flooding occurs during the 1 in 30 year events. Flooding could occur at Manholes Nos: 1-3 in a 1 in 200 year rainfall event including an allowance for climate change of 40% (see proposed drainage strategy drawing in Appendix I), however the proposed new drainage infrastructure through larger diameter surface water carrier pipes will significantly reduce the potential flooded volume generated during this rainfall event on site from 206 m$^3$ (existing situation) to 44 m$^3$, a betterment of 79%.

6.5 Other Considerations

Pollution Control

6.5.1 Appropriate pollution control measures will be included in the surface water drainage system to minimise the risk of contamination or pollution entering the receiving systems from surface water runoff from the development. Waste will be handled in a controlled manner, and handling areas will be restricted to inside the building footprint. Assessments have been undertaken to assess areas of risk outside the buildings and the treatment trains required to mitigate the pollution risks.

6.5.2 The drainage system will therefore be designed to comply with the requirements of the risk-based approach as laid out in CIRIA 753 ‘The SuDS Manual’.

6.5.3 An oil interceptor is proposed on site to separate fuel and oil from surface water before discharge to the public surface water sewer which runs parallel to the eastern site boundary.

6.5.4 The designated wash area will be isolated using channels, gullies, a surface gradient and kerbs. The runoff from the wash down area will be directed to a silt trap or settlement tank to remove larger particles of silt and sediment. It is proposed then to discharge runoff to the 225mm foul sewer which runs parallel to the eastern site boundary.

6.5.5 The final strategy for pollution control will be confirmed as part of the detailed design but the concepts of the drainage strategy have been agreed with Anglian Water, the waste handling methodology agreed in liaison with the end-users.
Adoption and Management

6.5.6 NCC has confirmed that they do not adopt SuDS features. The ongoing management and maintenance of the proposed surface water management systems is expected to fall under the responsibility of the relevant site management company.

6.5.7 Long term management of surface water drainage assets, including any SuDS components, is essential to ensure they continue to function to their design standard. As such, a management and maintenance plan will need to be developed in order to ensure the systems continue to work effectively.

6.5.8 The final strategy for adoption of drainage systems and the SuDS maintenance plan, including a maintenance schedule and details of easements and outfalls for the drainage system, will be produced at the detailed design phase, once details of the surface water drainage strategy have been finalised.
7 Residual Risk

7.1.1 It is difficult to completely guard against flooding since extreme events greater than the design standard event are always possible, however, it is practicable to minimise the risk by allowing a substantial freeboard (safety margin) and by using suitable construction and management techniques.

7.1.2 The below points set out how residual risk has been considered:

- Application of sequential approach - locating the more sensitive/vulnerable elements of new development in the areas which lie at lowest probability of flooding;
- Recommended incorporation of 150mm ‘freeboard’ in ground floor levels and appropriate profiling of exterior ground levels away from building entrances;
- Provision of appropriate surface water drainage systems, including consideration of projected impacts of climate change and exceedance events;
- Plans in place for future management and maintenance of drainage systems.

7.1.3 As such, the residual risk is considered to be acceptable for the lifetime of the development.
8 Conclusions

8.1.1 This Flood Risk Assessment (FRA) has been prepared by Peter Brett Associates LLP (PBA) to support a planning application for the redevelopment of a waste transfer station at Daventry, Northamptonshire.

8.1.2 This FRA concludes that:

- The site is in Flood Zone 1 – ‘low’ probability of fluvial flooding on any one year;
- The site is considered to be at low risk from other sources of flooding.
- The proposed mitigation strategy demonstrates the development is safe through a number of measures as follows:
  - Sequential approach to site layout;
  - Ground floor levels a minimum 150mm higher than surrounding ground levels;
  - Exterior levels to be graded away from building entrances.
- The surface water drainage strategy is to restrict all development runoff up to and including the 1 in 200 year event including an allowance for climate change of 40%, to the pre-development 1 in 1 year rate with a 68% betterment. The proposed outfall is to the public surface water sewer which runs parallel to the eastern site boundary as agreed with Anglian Water. The proposed drainage infrastructure will significantly reduce the flooded volume generated in a 1 in 200 year event including an allowance for climate change.
- Waste will be handled in a controlled manner, and assessments have been undertaken to assess areas or risk and treatment trains required. Following consultation with the end users, the discharge strategies have been agreed with Anglian Water. Flow from the wash-down area and areas where waste will be handled will drain to the existing foul sewer which runs parallel to the eastern site boundary.

8.1.3 In conclusion, the future occupants and users of the proposed development will be safe from flooding and there will be no detrimental impact on third parties. The proposal complies with the National Planning Policy Framework (NPPF) and local planning policy with respect to flood risk and is an appropriate development at this location.
Appendix A  Site Plan and Topographic Survey
1. All dimensions to be verified on site by GENERAL CONTRACTOR and any work or setting out or preparing shop drawings.

2. © copyright SAUNDERS BOSTON LIMITED. All rights reserved.

3. This drawing remains the property of SAUNDERS BOSTON LIMITED at all times and may not be reproduced or copied in whole or in part without their prior written consent.

4. This drawing and related specifications are for use only in the stated location.

5. Drainage has not been surveyed and all pipe locations and below ground drainage runs are indicative.
Appendix B  Anglian Water Records and Correspondence
Michael Hartley,

Thank you for your Flood Risk Query you submitted for High March Waste Transfer Depot, Daventry.

Our response to this is: Anglian Water is able to confirm that we have no records of flooding in the vicinity that can be attributed to capacity limitations in the public sewerage system. It is possible that other flooding may have occurred that we do not have records of, other organisations such as the Local Authority, Internal Drainage Board or the Environment Agency may have records.

Should you have any questions relating to this please contact 0345 0265 458. Your reference for this enquiry is 00023976.

Kind Regards
Growth and Planning Services Team

This message has been scanned for viruses by Websense
Pre-Planning Assessment Report

High March, Daventry
Section 1: Proposed Development

Thank you for submitting a pre-planning enquiry. This has been produced for Peter Brett Associates LLP. Your reference number is 00024119. If you have any questions upon receipt of this report, please contact the Pre-Development team on 01733 414690 or email planningliaison@anglianwater.co.uk.

The response within this report has been based on the following information which was submitted as part of your application:

<table>
<thead>
<tr>
<th>List of Planned Developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Development</td>
</tr>
<tr>
<td>B8 Storage or Dist.</td>
</tr>
</tbody>
</table>

- The grid reference for the site is SP5809761728.
- The site currently does not have planning permission and is located on a brownfield site.

Disclaimer: The accuracy of this report is therefore not guaranteed and does not obviate the need to make additional appropriate searches, inspections and enquiries. You are advised therefore to renew your enquiry should there be a delay in submitting your application for water supply/sewer connection to re-confirm the situation.
Section 2: Assets Affected

Our records indicate that we have the following types of assets within or overlapping the boundary of your development site as listed in the table below.

Additionally, it is highly recommended that you carry out a thorough investigation of your proposed working area to establish whether any unmapped public or private sewers and lateral drains are in existence. We are unable to permit development either over or within the easement strip without our prior consent. The extent of the easement is provided in the table below. Please be aware that the existing water mains/public sewers should be located in highway or open space and not in private gardens. This is to ensure available access for any future maintenance and repair and this should be taken into consideration when planning your site layout.

<table>
<thead>
<tr>
<th>Water and Used Water Easement Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asset Type</strong></td>
</tr>
<tr>
<td>Public Foul Sewer</td>
</tr>
</tbody>
</table>

If it is not possible to avoid our assets then the water main/sewer may need to be diverted in accordance with Section 185 of the Water Industry Act (1991). We have a duty to divert our sewerage infrastructure if requested to do so although this would be at your expense. You will need to make a formal application if you would like a diversion to be considered. A copy of the section 185 diversion application form can be found at www.anglianwater.co.uk/developers

Due to the private sewer transfer in October 2011 many newly adopted public used water assets and their history are not indicated on our records. You also need to be aware that your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.
Section 3: Water Recycling Services

In examining the used water system we assess the ability for your site to connect to the public sewerage network without causing a detriment to the operation of the system. We also assess the receiving water recycling centre and determine whether the water recycling centre can cope with the increased flow and influent quality arising from your development.

Water Recycling Centre
The foul drainage from the proposed development is in the catchment of Whitton Water Recycling Centre, which currently has capacity to treat the flows from your development site. Anglian Water cannot reserve capacity and the available capacity at the water recycling centre can be reduced at any time due to growth, environmental and regulation driven changes.

Used Water Network
Based on the information provided it appears that the site currently drains to the foul sewer to the North of the site in High March, you have stated that you wish to reuse this connection point. Our topography assessment has indicated that a connection to the foul sewer located in High March would require a pumped connection, this would be at a maximum rate of 3.8 l/s which is inclusive of the trade effluent coming from the vehicle washing bay.

As per your request we have assessed the impact of a pumped solution to the public foul sewerage network. We can confirm that this is acceptable as the foul sewerage system, at present, has available capacity for your site. The connection point will be to manhole 1701 in High March at NGR SP5811961739 at a discharge rate of 3.8l/s.

As per the current version of Sewers for Adoption, Anglian Water would wish to see an intermediate manhole constructed no closer than 5 metres from manhole 1701 for pumped connections to allow your flows to gravitate.

Surface Water Disposal
Anglian Water has assessed a connection to the public surface water sewer as per your attached documentation. Our desktop analysis found that the closest surface water sewer would require a pumped solution which we do not deem to be a feasible solution for your site.

Alternative methods of surface water disposal will need to be investigated such as infiltration or discharge to a watercourse in accordance with the surface water hierarchy outlined in Building Regulations Part H.

As you may be aware, Anglian Water will consider the adoption of SuDs provided that they meet the criteria outline in our SuDs adoption manual. This can be found on our website at [http://www.anglianwater.co.uk/developers/suds.aspx](http://www.anglianwater.co.uk/developers/suds.aspx). We will adopt features located in
public open space that are designed and constructed, in conjunction with the Local Authority and Lead Local Flood Authority (LLFA), to the criteria within our SuDs adoption manual. Specifically, developers must be able to demonstrate:

1. Effective upstream source control,
2. Effective exceedance design, and
3. Effective maintenance schedule demonstrating than the assets can be maintained both now and in the future with adequate access.

If you wish to look at the adoption of any SuDs then an expression of interest form can be found on our website at: http://www.anglianwater.co.uk/developers/suds.aspx

**Trade Effluent**
We note that you do not have any trade effluent requirements. Should this be required in the future you will need our written formal consent. This is in accordance with Section 118 of the Water Industry Act (1991).

**Used Water Budget Costs**
It has been assumed that the onsite used water network will be provided under a section 104 Water Industry Act application. It is recommended that you also budget for both infrastructure charges and connection costs. The 2017/18 charges are:

| Infrastructure Charge | £361.00 per connection |

Please note that we offer alternative types of connections depending on your needs and these costs are available in our annual charges booklet, which can be downloaded from www.anglianwater.co.uk/developers/charges.
Figure 1: Showing your used water point of connection at manhole 1701
Section 5: Useful Information

Water
Water Industry Act – Key Water Sections:
• **Section 41:** This provides you with the right to requisition a new water main for domestic purposes to connect your site to the public water network.
• **Section 45:** This provides you with the right to have a connection for domestic purposes from a building or part of a building to the public water main.
• **Section 51A:** This provides you with the right to provide the water main or service connection yourself and for us to vest them into our company.
• **Section 55:** This applies where you request a supply of water for non domestic premises.
• **Section 185:** This provides you with the right to make a reasonable request to have a public water main, sewer or public lateral drain removed or altered, at your expense. Details on how to make an application and the s185 form is available on our website at [http://www.anglianwater.co.uk20/developers](http://www.anglianwater.co.uk20/developers) or via our Developer Services team on 08457 60 66 087.

Details on how you can make a formal application for a new water main, new connection or diversion are available on from our Developer Services team on 08457 60 66 087 or via our website at [www.anglianwater.co.uk/developers](http://www.anglianwater.co.uk/developers)

If you have any other queries on the rights to requisition or connect your housing to the public water and sewerage infrastructure then please contact our developer services team at: Developer Services, Anglian Water, PO Box 495, Huntingdon, PE29 6YY or Telephone: 0845 60 66 087 or Email: developerservices@anglianwater.co.uk

Water pressure and flow rate: The water pressure and consistency that we must meet for your site is laid out in the Water Industry Act (1991). This states that we must supply a flow rate of 9 litres per minute at a pressure of 10 metres of head to the external stop tap. If your water pressure requirements exceed this then you will need to provide and maintain any booster requirements to the development site.

Self Lay of Water Mains: A list of accredited Self Lay Organisations can be found at [www.lloydsregister.co.uk/schemes/WIRS/providers-list.aspx](http://www.lloydsregister.co.uk/schemes/WIRS/providers-list.aspx).

Used Water
Water Industry Act – Key Used Water Sections:
• **Section 98:** This provides you with the right to requisition a new public sewer. The new public sewer can be constructed by Anglian Water on your behalf. Alternatively, you can construct the sewer yourself under section 30 of the Anglian Water Authority Act 1977.
• **Section 102:** This provides you with the right to have an existing sewerage asset vested by us. It is your responsibility to bring the infrastructure to an adoptable condition ahead of the asset being vested.
• **Section 104:** This provides you with the right to have a design technically vetted and an agreement reached that will see us adopt your assets following their satisfactory construction and connection to the public sewer.

• **Section 106:** This provides you with the right to have your constructed sewer connected to the public sewer.

• **Section 185:** This provides you with the right to have a public sewerage asset diverted.

Details on how to make a formal application for a new sewer, new connection or diversion are available on our website at [www.anglianwater.co.uk/developers](http://www.anglianwater.co.uk/developers) or via our Developer Services team on 08457 60 66 087.

**Sustainable Drainage Systems:**
Many existing urban drainage systems can cause problems of flooding, pollution or damage to the environment and are not resilient to climate change in the long term. Therefore our preferred method of surface water disposal is through the use of Sustainable Drainage Systems (SuDS). SuDS are a range of techniques that aim to mimic the way surface water drains in natural systems within urban areas. For more information on SuDS, please visit our website at [http://www.anglianwater.co.uk/developers/suds.aspx](http://www.anglianwater.co.uk/developers/suds.aspx). We also recommend that you contact the Local Authority and Lead Local Flood Authority (LLFA) for the area to discuss your application.

**Private Sewer Transfers:** Sewers and lateral drains connected to the public sewer on the 1 July 2011 transferred into Water Company ownership on the 1 October 2011. This follows the implementation of the Floods and Water Management Act (FWMA). This included sewers and lateral drains that were subject to an existing Section 104 Adoption Agreement and those that were not. There were exemptions and the main non-transferable assets were as follows:

• Surface water sewers and lateral drains that did not discharge to the public sewer, e.g. those that discharged to a watercourse.
• Foul sewers and lateral drains that discharged to a privately owned sewage treatment/collection facility.
• Pumping stations and rising mains will transfer between 1 October 2011 and 1 October 2016.

The implementation of Section 42 of the FWMA will ensure that future private sewers will not be created. It is anticipated that all new sewer applications will need to have an approved section 104 application ahead of a section 106 connection.

**Encroachment:** Anglian Water operates a risk based approach to development encroaching close to our used water infrastructure. We assess the issue of encroachment if you are planning to build within 400 metres of a water recycling centre or, within 15 metres to 100 metres of a pumping station. We have more information available on our website at [http://anglianwater.co.uk/developers/encroachment.aspx](http://anglianwater.co.uk/developers/encroachment.aspx)
Locating our assets: Maps detailing the location of our water and used water infrastructure including both underground assets and above ground assets such as pumping stations and recycling centres are available from www.digdat.co.uk. All requests from members of the public or non-statutory bodies for maps showing the location of our assets will be subject to an appropriate administrative charge. We have more information on our website at: www.anglianwater.co.uk/developers/our-assets/

Summary of charges: A summary of this year’s water and used water connection and infrastructure charges can be found at http://www.anglianwater.co.uk/developers/charges/

Disclaimer: The information provided within this report is based on the best data currently recorded, recorded within the last 12 months or provided by a third party. The position must be regarded as approximate. If there is further development in the area or for other reasons the position may change.

The accuracy of this report is therefore not guaranteed and does not obviate the need to make additional appropriate searches, inspections and enquiries. You are advised therefore to renew your enquiry should there be a delay in submitting your application for water supply/sewer connection to re-confirm the situation.

Any cost calculations provided within the report are estimated only and may be subject to change.

The responses made in this report are based on the presumption that your proposed development obtains planning permission. Whilst this report has been prepared to help assess the viability of your proposal, it must not be considered in isolation. Anglian Water supports the plan led approach to sustainable development that is set out in the National Planning Policy Framework (NPPF). As a spatial planning statutory consultee, we assist planning authorities in the preparation of a sustainable local plan on the basis of capacity within our water and water recycling (formerly referred to as wastewater) infrastructure. Consequently, any infrastructure needs identified in this report must only be considered in the context of up to date, adopted or emerging local plans. Where local plans are absent, silent or out of date these needs should be considered against the definition of sustainability set out in the NPPF as a whole.

No liability whatsoever including liability for negligence is accepted by Anglian Water Services Limited for any error or inaccuracy or omission including the failure to accurately record or record at all, the location of any water main, discharge pipe, sewer, or drain or disposal main or any item of apparatus.
Dear Michael Hartley

RE: High March, Daventry.

Hi Michael

Thank you for your email

We have performed a desktop assessment for you and found that a gravity connection at manhole 1751 at 13 l/s would be perfectly acceptable to Anglian Water. The reason manhole 0751 was offered as we assumed you may have struggle to make a connection to manhole 1751. Should you be able to achieve this, feel free to connect there at 13 l/s.

I hope this helps. Should you have any further questions, do not hesitate to contact us.

Kind regards

Should you have any questions relating to this please contact 0345 606 6087 Option 1. Your reference for this enquiry is 00026030.

Kind Regards
Growth and Planning Services Team

--------------------------------------------
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Appendix C  Geological Data
1:50 000 scale bedrock geology description:
Whitby Mudstone Formation - Mudstone. Sedimentary bedrock formed approximately 174 to 163 million years ago in the Jurassic Period. Local environment previously dominated by shallow seas.

Setting: shallow seas. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse- to fine-grained (locally with some carbonate content) forming interbedded sequences.

Further details
What is Bedrock Geology?
To purchase detailed geological reports for this area, try our Geoauctions service.
**BOREHOLE RECORD** - Dynamic Sampler

**Client:** PETER BRETT ASSOCIATES LLP

**Properties**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Type</th>
<th>Strength kPa</th>
<th>W</th>
<th>SPT N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.20</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Firm brown slightly gravelly sandy clay. Gravel is angular to subrounded fine to medium brick.</td>
</tr>
<tr>
<td>0.40</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Soft grey mottled brown slightly sandy clay.</td>
</tr>
<tr>
<td>0.50-0.80</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td>Soft brown mottled grey slightly sandy CLAY.</td>
</tr>
<tr>
<td>1.00</td>
<td>D</td>
<td></td>
<td></td>
<td>0.0</td>
<td>Below 1.60m, becoming grey mottled brown.</td>
</tr>
<tr>
<td>1.20-2.00</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td>Firm to stiff grey CLAY with occasional pockets of mice. (up to 10m in size)</td>
</tr>
<tr>
<td>1.20-1.65</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td>0.0</td>
<td>Below 3.40m, becoming fissured. Fissures are subhorizontal extremely closely spaced with light blue staining on surfaces and subvertical with blue grey staining on surfaces. Below 3.50m, becoming stiff.</td>
</tr>
<tr>
<td>1.50</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td>0.0</td>
<td>At 4.20m, ammonoid (5mm in size).</td>
</tr>
<tr>
<td>2.00-2.45</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>3.00-4.00</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.00-3.45</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>3.50</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>4.00-4.45</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>5.00-5.45</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

- Inspection pit hand excavated to 1.20m depth and no services were found.
- ES sample = 1 x vial, 1 x plastic jar and 1 amber jar

**Groundwater:**

- None encountered during sampling.

**Symbols and abbreviations are explained on the accompanying key sheet.**

All dimensions are in metres. Logged in accordance with BS5930:2015.
### Borehole Record

#### Project Details
- **Client:** PETER BRETT ASSOCIATES LLP
- **Project No:** PC176882
- **Engineer:** PETER BRETT ASSOCIATES LLP
- **Borehole:** WS02

#### Sampling
<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Sample Type</th>
<th>Strength kPa</th>
<th>W %</th>
<th>SPT N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10-0.25</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Firm brown slightly gravelly sandy clay with occasional rootlets. Gravel is angular to subrounded fine to coarse brick.</td>
</tr>
<tr>
<td>0.10</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.30</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.60</td>
<td>ES</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>POSSIBLE MADE GROUND: Soft grey mottled orange brown slightly sandy slightly gravelly CLAY with occasional pockets of sand (up to 10mm in size) and mica (up to 2mm in size) Gravel is subrounded fine to medium flint.</td>
</tr>
<tr>
<td>1.10</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.20-2.20</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.20-1.65</td>
<td>D</td>
<td>NIL</td>
<td>85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.50</td>
<td>D (DRY)</td>
<td>0</td>
<td>0</td>
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<td>3.00</td>
<td>D (DRY)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3.50</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.00-4.45</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.00</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.30-4.70</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.50</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.70-5.00</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.00-5.45</td>
<td>D</td>
<td>NIL</td>
<td>828</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td>D (DRY)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Groundwater

- **End of Borehole:** 5.45

#### Remarks
- **Inspection Pit:** Hand excavated to 1.20m depth and no services were found.
- **Dynamic Sampler:** 1 x vial, 1 x plastic jar and 1 amber jar

**Figure:** 1 of 1

### Boring Progress
- **Inspection Pit:** DN/IB
- **Dynamic Sampler:** DN/IB

#### Groundwater on Depth

- **Remarks on Groundwater:** None encountered during excavation.
## Strata

<table>
<thead>
<tr>
<th>Depth</th>
<th>Sample Type</th>
<th>Strength kPa</th>
<th>W</th>
<th>SPT N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.18</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Concrete, strong to very story grey concrete. Approximately 70-80% aggregate of angular to subrounded fine to coarse granite, quartzite and possible chert with approximately 1%-2% voids up to 4mm in size.</td>
</tr>
<tr>
<td>0.20-0.30</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subangular fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>0.35-0.45</td>
<td>ES</td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Grey and greyish brown clayey sand and gravel with a low brick cobble content. Sand is fine to coarse coal is angular to subrounded fine to coarse brick and rare coal.</td>
</tr>
<tr>
<td>0.50</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>POSSIBLE MADE GROUND: Firm grey and dark grey mottled greenish grey slightly sandy slightly gravelly clay with occasional black carbonous wood fragments (up to 50mm in size). Gravel is angular to subrounded fine to coarse brick and rare coal.</td>
</tr>
<tr>
<td>0.60</td>
<td>ES</td>
<td></td>
<td></td>
<td></td>
<td>Stiff fissured grey occasional mottled brown CLAY with frequent mica (up to 2mm in size) Fissures are stiff to very stiff with bluish grey staining.</td>
</tr>
<tr>
<td>0.70-1.20</td>
<td>B</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Concrete, strong to very story grey concrete. Approximately 70-80% aggregate of angular to subrounded fine to coarse granite, quartzite and possible chert with approximately 1%-2% voids up to 4mm in size.</td>
</tr>
<tr>
<td>1.00</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subangular fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>1.20-1.90</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey and greyish brown clayey sand and gravel with a low brick cobble content. Sand is fine to coarse coal is angular to subrounded fine to coarse brick and rare coal.</td>
</tr>
<tr>
<td>1.20-1.65</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey and greyish brown clayey sand and gravel with a low brick cobble content. Sand is fine to coarse coal is angular to subrounded fine to coarse brick and rare coal.</td>
</tr>
<tr>
<td>1.50</td>
<td>NIL</td>
<td>PID=0.0</td>
<td></td>
<td>S9</td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>1.90</td>
<td>B</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>2.00-2.45</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td>S13</td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>2.50</td>
<td>NIL</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>3.00-4.00</td>
<td>B</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>3.00-3.45</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td>S21</td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>3.50</td>
<td>NIL</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>4.00-4.50</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td>S27</td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>4.00-4.45</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>4.50</td>
<td>NIL</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>5.00</td>
<td>NIL</td>
<td>PID=0.0</td>
<td></td>
<td>S38</td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
<tr>
<td>5.45</td>
<td>D</td>
<td>PID=0.0</td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse quartzite, granite and occasional brick.</td>
</tr>
</tbody>
</table>

---

**Remarks:**
Inspection pit hand excavated to 1.20m depth and no services were found. Made sample = 1 x vial, 1 x plastic jar and 1 amber jar

Logged in accordance with BS5930:2015

---

**Symbols and abbreviations are explained on the accompanying key sheet.**
### Sample Properties

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Sample Type</th>
<th>Depth Cased &amp; (to Water)</th>
<th>Strength (kPa)</th>
<th>w (%)</th>
<th>SPT N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 - 0.19</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Concrete, strong to very strong grey concrete approximately 70-80% aggregate of angular to subrounded fine to coarse granite, quartzite and possible chert with approximately &lt;1% voids up to 3mm in size. Between 0.10-0.11m, 10mm diameter repour.</td>
</tr>
<tr>
<td>0.40</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Grey sand and gravel. Sand is fine to coarse. Gravel is angular to subangular fine to coarse brick. At 0.19m, black plastic membrane.</td>
</tr>
<tr>
<td>1.20 - 2.00</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MADE GROUND: Soft to firm grey slightly sandy slightly gravelly clay with rare wood fragments (up to 40mm in size). Gravel is angular to subangular fine to coarse brick.</td>
</tr>
<tr>
<td>1.20 - 1.65</td>
<td>D</td>
<td>(1.20)</td>
<td>PID=0.0</td>
<td>S10</td>
<td></td>
<td>MADE GROUND: Firm grey dark grey slightly sandy slightly gravelly slightly organic clay with fine rootlets. Gravel is a fine to medium brick.</td>
</tr>
<tr>
<td>2.00 - 3.00</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>POSSIBLE MADE GROUND: Firm grey mottled greenish grey slightly sandy slightly organic CLAY with rare rootlets.</td>
</tr>
<tr>
<td>3.00 - 3.40</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Firm, locally stiff grey and bluish grey mottled orangish brown CLAY with occasional rootlets (up to 1mm wide) and pockets of orange sandy clay (up to 5mm in diameter).</td>
</tr>
<tr>
<td>3.70 - 4.00</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Stiff fissured grey micaceous CLAY. Fissures are stiff to hard extremely spaced with blue staining on surfaces.</td>
</tr>
<tr>
<td>4.00 - 4.45</td>
<td>D</td>
<td>(DRY)</td>
<td>PID=0.0</td>
<td>S25</td>
<td></td>
<td>At 3.95m, orange brown sand layer 2mm thick.</td>
</tr>
<tr>
<td>5.00 - 5.45</td>
<td>D</td>
<td>(5.00)</td>
<td>PID=0.0</td>
<td>S27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Boring

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Hole Dia</th>
<th>Technique</th>
<th>Crew</th>
<th>Date</th>
<th>Time</th>
<th>Remarks on Groundwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.19</td>
<td>0.30</td>
<td>Concrete Core</td>
<td>ST</td>
<td>G.L.</td>
<td>08/10/17 08:00</td>
<td>Seepage</td>
</tr>
<tr>
<td>1.20</td>
<td>5.45</td>
<td>Inspection Pit</td>
<td>DH/IB</td>
<td>DAMP</td>
<td>08/10/17 18:00</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks

- Inspection pit hand excavated to 1.20m depth and no services were found.
- ES sample = 1 x vial, 1 x plastic jar and 1 amber jar
0.00-0.16  C  Strong to very strong grey concrete approximately 70-80% aggregate of angular to subrounded fine to coarse quartzite and flint with 1% voids up to 2mm in size.

0.20-0.40  B  MADE GROUND: Bluish grey sand and gravel. Gravel is subangular to subrounded fine to coarse limestone and brick.

0.50  D  MADE GROUND: Firm grey slightly sandy slightly gravelly clay with a low cobble content of brick. Gravel is angular to subrounded fine to coarse limestone and brick.

1.20-2.00  D  MADE GROUND: Soft greenish grey slightly sandy slightly gravelly clay with occasional pockets of black root remains (up to 10mm in size). Gravel is angular to subrounded fine to coarse brick.

1.20-1.50  NIL  S2/150  Gravel is angular to subrounded fine to coarse brick.

1.50  (0.80)  PID=  Firm grey slightly sandy CLAY with occasional light brown mottling.

2.00-2.45  D  MADE GROUND: Bluish grey sand and gravel. Gravel is subangular to subrounded fine to coarse limestone and brick.

2.50-2.75  D  MADE GROUND: Bluish grey sand and gravel. Gravel is subangular to subrounded fine to coarse limestone and brick.

2.75-3.00  D  MADE GROUND: Bluish grey sand and gravel. Gravel is subangular to subrounded fine to coarse limestone and brick.

3.00-3.45  D  MADE GROUND: Bluish grey sand and gravel. Gravel is subangular to subrounded fine to coarse limestone and brick.

4.00-4.45  D  MADE GROUND: Bluish grey sand and gravel. Gravel is subangular to subrounded fine to coarse limestone and brick.

4.50  D  MADE GROUND: Bluish grey sand and gravel. Gravel is subangular to subrounded fine to coarse limestone and brick.

5.00-5.45  D  MADE GROUND: Bluish grey sand and gravel. Gravel is subangular to subrounded fine to coarse limestone and brick.

End of Borehole
Daventry Waste Transfer Station
FIGURE 2 – Proposed Exploratory Hole Locations

Window Sample Boreholes

CBR Location

N.B
CBR1, CBR2 and CBR 4 to be carried out on subbase
CBR 3 and CBR5 to be carried out on subgrade

Date 22/09/2017
Scale A3 – Not to Scale
Drawn by JC
Checked by OB
Revision -
Project Number 41903
Appendix D  Environment Agency Information
Dear Michael

Provision of Floodmap for High March Waste Transfer Depot

Thank you for your request of 26th September 2017 to use Environment Agency data. The information is attached.

As this site is in Flood Zone 1, the data we hold is limited.

The information on Flood Zones in the area relating to this address is as follows:

The property is in an area located within Flood Zone 1 shown on our Flood Map for Planning (Rivers and Sea) and therefore the data we hold is limited.

Note - This information relates to the area that the above named property is in and is not specific to the property itself.

Further details about the Environment Agency information supplied can be found on the GOV.UK website:

https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion
https://www.gov.uk/government/publications/flood-risk-maps-for-surface-water-how-to-use-the-map but if you do have concerns regarding surface water flooding, this will be addressed by your local authority.

With regards to the history of flooding I can advise that we do not have any records of flooding in this area. It is possible that other flooding may have occurred that we do not have records for, and other organisations, such as the Local Authority or Internal Drainage Boards, may have records.

This data will be shared under the Open Government Licence, to read this and find out about permitted use, please click here.

I hope that we have correctly interpreted your request. Please see the attached Standard Notice or licence for details of permitted use.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.
Good Afternoon Michael,

I have passed your e-mail to the local customer team who will deal with your request.

The Freedom of Information Act and Environmental Information Regulations state that a public authority must respond to requests for information within 20 working days, but we aim to respond to all enquiries as quickly as we can.

You can find more information about our service commitment by clicking on the link below:


You can contact our customer team directly on the contact details below, or call the National Customer Contact Centre on 03708 506506 who will transfer you to the area team.

Please quote your enquiry reference 170926/CAMB02 in any correspondence with us regarding this matter.

Kind Regards,

Colleen Buckley
Customer Service Adviser
National Customer Contact Centre - Part of National Operations Services

Tel: 03708 506 506
Web Site: www.gov.uk/environment-agency

Click an icon to keep in touch with us:-

So how did we do...?
Dear Sir/Madam,

Peter Brett Associates are carrying out a Flood Risk Assessment for the proposed redevelopment of High March Waste Transfer Depot located in Daventry, Northamptonshire. The site is centred at 458097E, 261709N. Nearest Post Code: NN11 4QB. A location plan is attached.

We would be grateful if you could provide us the following information:

- Any records of flooding for the site
- Groundwater data
- Fluvial Flood Map for the site
- Any other information you hold in relation to flood risk

We are also in contact with Northamptonshire County Council (LLFA), Daventry District Council and Anglian Water.

Kind Regards,

Michael Hartley
For and behalf of Peter Brett Associates LLP
Legend

- Zone B
- Zone C1
- Zone C2
- Risk of flooding from rivers and sea
  - High (>=3.3%)
  - Medium (3.3% - 1%)
  - Low (1% - 0.1%)
  - Very Low (<0.1%)
- Defences
- Flood Storage Areas
  - Areas benefiting from flood defence
- Flood Zone 3
- Flood Zone 2
  - High (>= 3.3%)
  - Medium (3.3% - 1%)
  - Low (1% - 0.1%)

Appendix E  NCC & DDC Records and Correspondence
Dear Michael

Thank you for requesting flood risk data for the above sites. Please find below and attached our response to your request.

**Historic Flood Records**

Since the creation of the LLFA role in 2010, NCC has undertaken to collect as much information as possible relating to historic flood incidents within the county. We have recorded, if known, where actions have been undertaken or are proposed to alleviate the flood risk. The data we have collected is not considered to be exhaustive, and data relating to flood incidents occurring prior to 2010 is limited. For the above site;

**Within the site boundary:**
- There are no reports of flooding within the site boundary

**Within 500m of the site boundary:**
- Vernon Close, Daventry, date of flood 15/03/2016. Flooding to highway, main cause of flood artificial drainage blockage. Source of information, Northamptonshire Highways.
- Keys Close Daventry, date of flood 06/01/2014. Flooding of communal car parking area and rear gardens of 2 properties. Depth of flood up to 100mm. Main cause of flood, artificial drainage blockage. Source of information, Daventry District Council.
**Asset Register**

Under the Flood and Water Management Act 2010 we have a duty to maintain a register of assets which have a significant impact on flood risk. We have undertaken a search of our Asset Register, which contains information on all assets relating to flood risk within the county which we have been made aware of. A summary of any assets shown to lie within the site boundary and within a 500m buffer of the site is provided below. Exact details of third party assets should be requested from the relevant risk management authority.

**Within the site boundary:**
- Public foul sewer, 450mm, south west corner of site owned by Anglian Water.

**Within 500m of the site boundary**
- Culvert carrying bridleway over drainage ditch approximately 420m east of site boundary, owned by Northamptonshire Highways.
- Balancing/attenuation pond for runoff retention, York Way Daventry (on Ordinary watercourse), approximately 450m south east of site boundary. Privately owned and maintained.
- Sewer pumping station and sewer discharge point, High March, approximately 420m south east of site boundary owned by Anglian Water.
- Various public surface water and foul sewers (adjacent site boundary 300mm surface water sewer, 225mm foul sewer, High March) owned by Anglian Water.
- Flow Control device, South March owned by Anglian Water.
- Highway gullies (adjacent site High March and South Way) owned by Northamptonshire Highways.
- Covered reservoir, approximately 415m east of site boundary, no further information available.
- Ordinary watercourse 420m south east of site boundary, eastwards flow. Riparian owned
- Various drainage ditches. Riparian owned

**Risk of Flooding from Surface Water**

We have enclosed a copy of the Updated Flood Map for Surface Water for the site. This map identifies areas where there is a risk of flooding from surface water. At these locations, the mapping has been given a confidence level of County to Town. This modelling is suitable for identifying which parts of the county or town are at risk, suitable for identifying approximate extents, shallower and deeper areas.
The map shows a central isolated area of the site and adjacent the site on High March to be at risk from extreme 0.1% AEP (1in1000 annual chance) surface water flooding incidents.

The sequential approach should be taken in considering the site layout in relation to the risk of flooding from surface water runoff. No properties or sensitive development should be located in areas shown to be at risk of flooding.

**Risk of Flooding from Groundwater**

We have recently completed a detailed study into ground water flood risk in Northamptonshire. This is available on the Flood Toolkit at [http://www.floodtoolkit.com/pdf-library/](http://www.floodtoolkit.com/pdf-library/) > Statutory and Project Documents.

We have enclosed a copy of the Northamptonshire Ground Water Flood Risk Map only at a scale of 1:125,000 due to licensing restrictions on the map data, however in summary the site indicates negligible risk of ground water flooding.


**Ordinary Watercourse Consent**

Ordinary watercourses are riparian owned, i.e. the ownership and maintenance responsibilities are shared by the landowners on either side of the watercourse. It should be noted that the Northamptonshire Local Flood Risk Management Strategy contains a policy restricting development within 9m of any ordinary watercourse, without prior consent. Consenting for ordinary watercourses in Northamptonshire is dealt with by the Bedford Group of Drainage Boards, on behalf of Northamptonshire County Council. Consent would be required for all works within 9m of the watercourse, including discharge of surface water. For details of the consenting process please refer to the information on our Flood Toolkit at: [www.floodtoolkit.com/planning/developers/](http://www.floodtoolkit.com/planning/developers/).

Our information indicates an ordinary watercourse, a tributary of Whilton Branch Main River, approximately 420m south east of the site boundary, eastwards flow.

**Northamptonshire Local Flood Risk Management Strategy**

The Northamptonshire Local Flood Risk Management Strategy and the associated Action Plan was updated and approved in October 2016. This is published as a living document on the NCC Flood Toolkit at [www.floodtoolkit.com/pdf-library/](http://www.floodtoolkit.com/pdf-library/) (under Statutory and Project Documents). This document and its related policies and recommendations apply to all development and flood risk management work within the County of Northamptonshire.
**SuDS Guidance**

**Non-statutory technical standards** for the design, maintenance and operation of sustainable drainage systems have now been published on-line.

We have now published our guidance document "Local Standards and Guidance for Surface Water Drainage in Northamptonshire" which can be found on the flood toolkit on the Surface Water Drainage pages at [http://www.floodtoolkit.com/planning/surface-water-drainage/](http://www.floodtoolkit.com/planning/surface-water-drainage/).

This guide is primarily for use by developers, designers and consultants who are seeking guidance on the Lead Local Flood Authority's local requirements for the design of surface water drainage systems in Northamptonshire. This guide will also be used by our officers to ensure a consistent approach is taken when assessing plans and designs as part of the planning application process. This guidance document is referred to in the adopted Northamptonshire Local Flood Risk Management Strategy as policy. Therefore this document forms a material planning consideration. The guide is a living document, meaning new information and updates will be continually added as they emerge. This is especially important as this edition of the guide precedes any implementation of Schedule 3 of the Flood and Water Management Act (2010).

**Known Site-Specific Issues and Drainage Constraints**

The BGS Infiltration SuDS Map provides screening-level data that gives an indication of the suitability of the subsurface for infiltration SuDS features. For the site this dataset indicates that the site shows opportunities for bespoke infiltration. The subsurface is potentially suitable for infiltration SuDS although the design will be influenced by the ground conditions. Quantify infiltration rate via an infiltration/soakaway test and consider whether infiltration can be used as a SuDS technique alongside water storage (in ponds/chambers) and re-use.

The site shows potential for geohazard, ground instability problems are probably present. Before installing infiltration SuDS consider the potential for or the consequences of infiltration on ground stability.

The map indicates that the site has moderate susceptibility to ground water contamination. The groundwater may be vulnerable to contamination. Infiltrating water should be free of contaminants. Before installing infiltration SuDS, consider the risks associated with the transport of contaminants to the groundwater. Check previous land use and potential for the presence of contaminated ground.
Further information

Brownfield sites are strongly encouraged to discharge at the greenfield rate wherever possible. As a minimum, brownfield sites should reduce the discharge by 40% to account for the impacts of climate change, from the existing site runoff OR from the original un-surcharged pipe-full capacity of the existing system, whichever is the lowest. The strategy should also aim to imitate the existing runoff regime by maintaining existing subcatchments and/or topographic features where possible. The drainage strategy will also need to account for runoff entering the site from higher land.

Our information requirements in support of a planning application are outlined in our document Local Standards and Guidance for Surface Water Drainage in Northamptonshire V1.3 August 2016 (Updated September 2017), which can be found on our website at:
http://www.floodtoolkit.com/planning/surface-water-drainage/

Pre-Application Advice

We advocate the use of pre-application discussions to ensure SuDS can be incorporated into all developments at the early stage of design, and to streamline the planning approval process. We operate a pre-application advice service in which we can provide surface water drainage advice to developers on major planning applications for Town and Country Planning development. Further details on this process and the associated charges can be found at http://www.floodtoolkit.com/planning/surface-water-drainage/.

Adoption and Maintenance of SuDS

Northamptonshire County Council as Lead Local Flood Authority does not adopt SuDS.

If SuDS are designed purely to drain an adoptable highway then Northamptonshire Highways may adopt the SuDS feature. However each case is determined on its own merits and should be discussed with Northamptonshire Highways before any adoption assumptions are made. Please contact Northamptonshire Highways at: DevelopmentManagement@kierwsp.co.uk.

Anglian Water also has a SuDS Adoption Manual, which can be found here: http://www.anglianwater.co.uk/_assets/media/AW_SUDS_manual_AW_FP_WEB.pdf.

Developers can apply for Anglian Water to consider the adoption of your proposed SuDS scheme by submitting an expression of interest at , http://www.anglianwater.co.uk/developers/suds.aspx.
The responsibility remains with the developer to ensure that adequate long-term maintenance of any drainage system can be delivered. Evidence will be required to be submitted as part of any major planning application to demonstrate that agreements are in place for the entirety of the drainage system to be adopted and maintained in perpetuity.

There are four main options available to developers for the adoption and maintenance of SuDS:

1. The local sewerage undertaker/water company may adopt and maintain certain features;
2. Adoption could be agreed through a Section 106 agreement/ separate agreement with the borough, district, town or parish council and pay the Commuted Sums for the maintenance;
3. Set up or use a service management company; or
4. Adoption and maintenance by private individuals (only where the SuDS serve individual properties).

The adoption and maintenance of all drainage within a development would have to be discussed and agreed directly with the relevant Local Planning Authority.

**West Northamptonshire Joint Core Strategy**

The West Northamptonshire Joint Core Strategy is a key part of the Local Development Framework.

The Core Strategy sets out the long-term vision and objectives for the whole of the area covered by Daventry District, Northampton Borough and South Northamptonshire Councils for the plan period up to 2029, including strategic policies for steering and shaping development. It identifies specific locations for strategic new housing and employment and changes to transport infrastructure and other supporting community facilities, as well as defining areas where development will be limited. It also helps to ensure the co-ordination and delivery of other services and related strategies.


**Climate change**

Under the new climate change allowance guidance from the Environment Agency, developers should design the surface water attenuation on site to accommodate the 1:100year +20% cc and undertake a sensitivity analysis to understand the flooding implication for the 40% cc. If the implications are significant i.e. the site could flood existing development (additional flow of runoff from the site) or put people at risk (by increased hazard levels within or off the site) then a view
may be taken to provide more attenuation working up towards 40% cc, or to provide additional mitigation allowances, for example a higher freeboard to ensure no risk to third parties/on-site users for the extreme 40% cc scenario. This will tie into existing principles for designing for exceedance.

**Upper Nene catchment 1 in 200yr design standard**

Following the significant flooding to Northampton town centre in Easter 1998 improvements were made to the defences along the River Nene. In order to secure the level of protection afforded by the new defence we have agreed with the West Northants Joint Planning Unit that the standards set for new development should also be improved, beyond industry standards.

Therefore all new development in the Upper Nene catchment will be designed for a flood with a 0.5% probability (1 in 200 chance) occurring in any year, including an appropriate allowance for climate change. This includes design of mitigation for river flooding and any surface water attenuation. This applies across the whole of the Upper Nene catchment including all branches and arms of the Nene, upstream of Billing Aquadrome, and all tributaries such as Wootton Brook, Dallington Brook and Bugbrooke Brook.

This is supported by the Environment Agency’s document “Strategic Review of development and flood risk, Nene catchment Northampton and upstream” and reinforced more recently in the West Northamptonshire Strategic Flood Risk Assessment (SFRA) Level 1 (February 2009).

**FEH / FSR rainfall data**

Section 4.3.2. of the SUDS Manual (CIRIA C697) refers to Development Runoff. Within this Section, it is acknowledged that additional datasets have been added to Flood Estimation Handbook (FEH) and rainfall depths obtained using FEH show significant differences from those obtained from Flood Studies Report (FSR) in some parts of the country. Within Northamptonshire, rainfall depths are often greater using more up to date FEH datasets than those using FSR, therefore for various storm events, greater run-off is produced and additional attenuation is likely to be required.

FEH rainfall data is more up to date than FSR (England and Wales) therefore calculations should use this FEH data to determine the volume of surface water attenuation required on site. We recognise there are uncertainties associated with the use of any datasets. In particular, FSR rainfall data should be used where the critical storm duration is less than 60 minutes, as FEH data is less robust for short duration storms. FEH rainfall data can be used to determine the volume of storage required if the critical storm duration is greater than 30 minutes.
If FEH rainfall data is not used as described above, then sensitivity testing to assess the implications of FEH rainfall must be provided. This should demonstrate that the development proposals remain safe and do not increase flood risk to third parties.

In view of above, should you require any further information, or wish to discuss these matters further, please do not hesitate to contact us.

Yours Faithfully,
Malcolm Ball
Technician
For & on behalf of NCC – Lead Local Flood Authority

Disclaimer:

This response is made by the County Council in its capacity as a Lead Local Flood Authority as a statutory consultee. As a Lead Local Flood Authority we respond to Planning Applications considering where development has the greatest ability to affect flood risk. For the avoidance of doubt we do not comment on water quality, contaminated land/landfill, waste water, risk of flooding from ground water, biodiversity and ecological impact, fisheries, water framework directive, amenity, health & safety, or navigation.

These comments should be taken as general comments on surface water drainage only. A detailed review of any technical assessments, methodology and results has not been undertaken by the Council. Liability for such technical work therefore rests with organisation(s) who have undertaken this technical work and the Local Planning Authority, which is responsible for the planning decision.
Michael Hartley

From: Surface Water Drainage Assessment Team <swdrainage@northamptonshire.gov.uk>
Sent: 08 December 2017 12:21
To: Michael Hartley
Subject: RE: High March Waste Transfer Depot, Daventry Flood Risk and Drainage Query

Dear Michael,

Thank you for your email.

Yes, you are right. Please refer to the most up to date guidance on the climate change allowances [https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).

Under this guidance we would expect developers to design the surface water attenuation on site to accommodate the 1:200 year + 20% cc and undertake a sensitivity analysis to understand the flooding implication for the 40% cc. If the implications are significant i.e. the site could flood existing development (additional flow of runoff from the site) or put people at risk (by increased hazard levels within or off the site) then it may be necessary to provide more attenuation working up towards 40% cc, or to provide additional mitigation allowances, for example a higher freeboard to ensure no risk to third parties/onsite users for the extreme 40% cc scenario.

Hope the above is helpful. Please do not hesitate to contact us should you have any queries with regards to the above.

Kind Regards,

Pankit Shah
Principal Project Engineer

Surface Water Drainage Assessment Team (LLFA)
Northamptonshire County Council
One Angel Square
Angel Street
Northampton NN1 1ED

Phone: 01604 364306
Email: swdrainage@northamptonshire.gov.uk
Web: [www.floodtoolkit.com](http://www.floodtoolkit.com)

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From: Michael Hartley [mailto:mhartley@peterbrett.com]
Sent: 07 December 2017 08:49
Dear Michael,

Thank you for your email below. Please accept my apologies for the delay in getting back.

Having reviewed the details, I can confirm that the Daventry Waste Site falls within the Upper Nene Catchment. You can also check the same by going to our website [www.floodtoolkit.com](http://www.floodtoolkit.com). Then click on “Am I at Risk” from the top menu. A map will appear where you can add your post code and then from left hand side menu bar where it says “Select Layer”, please choose Upper Nene catchment and it will highlight the whole area in RED. I have just checked at the time of writing this email and can confirm that you site lies within Upper Nene Catchment and the design will be required for 1 in 200 Year + CC.

Please accept my sincere apologies for the previous advice as I did not check the area at the time and just went into the flow of your email trail where initially we discussed about Major development, then FRA, Brownfield rates and finally betterment. In fact I did not check your site at the time as I was just replying to the questions as they asked.

Anyway once again our apologies for any inconvenience that may have caused due to the incorrect piece of information and we look forward to your revised design with correct standards.

Hope the above is helpful. Please do not hesitate to contact us should you have any queries with regards to the above.

Kind Regards,

Pankit Shah
Good Afternoon Pankit

We liaised with you during September time to agree in principle the surface water discharge rates (see correspondence below).

We also obtained flood developer information (see attached) from the Surface Water Drainage Assessment Team.

Page 7 of the attached pdf suggests that all developments located within the Upper Nene catchment should be developed to provide attenuation with a 1 in 200 year (0.5% probability) design standard. We are just checking with you whether the Daventry Waste Transfer site falls within the Upper Nene catchment?? We originally agreed with you to restrict all flows up to the 1 in 100 year rainfall event including an allowance for climate change (20%) leaving the site to the existing 1 year discharge rate (40.7l/s) with a 40% betterment.

Many thanks

Michael

Kind regards,

Michael Hartley
For and on behalf of Peter Brett Associates LLP - Cambridge
Dear Michael,

Thank you for your email below.

With regards to your existing brownfield rates and proposed rate of 24.42 l/s with 40% betterment is acceptable to us.

Hope the above is helpful. Please do not hesitate to contact us should you have any queries with regards to the above.

Kind Regards,

Pankit Shah
Principal Project Engineer

Surface Water Drainage Assessment Team

Phone: 01604 364306
Email: swdrainage@northamptonshire.gov.uk
Web: www.floodtoolkit.com

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From: Michael Hartley [mailto:mhartley@peterbrett.com]
Sent: 28 September 2017 17:58
To: Surface Water Drainage Assessment Team <swdrainage@northamptonshire.gov.uk>
Cc: Robin Clarke <rclarke@peterbrett.com>; Stephen Forber <sforber@peterbrett.com>
Subject: High March Waste Transfer Depot, Daventry Flood Risk and Drainage Query

Dear Pankit,

Thank you for your response below.

We have modelled the existing drainage network utilising the attached topographic survey to establish the existing rates leaving the site using Microdrainage software (see attached calculations).
The calculated rates are:

1:1 year rate = 40.7l/s
1:30 year rate = 45.2l/s
1:100 year rate = 45.8l/s

A schematic drawing showing pipe reference numbers, manhole reference numbers, area of catchment draining into the existing network as referred to in the calculations is attached for your reference also. We have assumed 100% impermeable area.

As part of the redevelopment of the waste transfer station, we propose to restrict all flows up to the 1 in 100 year rainfall event including an allowance for climate change (20%) leaving the site to the existing 1 year discharge rate (40.7l/s) with a 40% betterment. This equates to a discharge rate of 24.42l/s. We would be grateful if you could confirm the proposed rate is acceptable.

Thank you

Kind regards,

Michael Hartley
Assistant Engineer
For and on behalf of Peter Brett Associates LLP - Cambridge

Dear Michael,

Thank you for your email below.

Yes, according to the current guidance document the minimum acceptable betterment on Brownfield sites are 20%. However we are publishing our revised Local Standard document next week (Friday) which will confirm the minimum acceptable betterment to be 40% and not 20%

So in order to answer your question, if you are putting a planning application before next Friday then it would be 20% otherwise 40% minimum acceptable. I would still however prefer it to be Greenfield though but it’s up to you and your client.

Hope the above is helpful. Please do not hesitate to contact us should you have any queries with regards to the above.

Kind Regards,

Pankit Shah
Principal Project Engineer

Surface Water Drainage Assessment Team
Dear Pankit,

We are required to produce a proposed surface water drainage sketch of the redevelopment of the waste transfer depot.

We are firstly assessing the current brownfield discharge rates from the site. Currently the site discharges unattenuated into the foul sewer.

A below ground storage tank coupled with a hydrobrake is initially proposed. You mentioned below that that you expect to see at least 50-80% betterment on all existing rates up to the 1 in 100year including an allowance for climate change (includes the 1 in 1yr rate all the way up to the 1 in 100year+CC rate). This is in slight conflict with the Northamptonshire County Council guidance doc which states for brownfield sites there should be a minimum 20% betterment on existing rates.

We will assess how much attenuation we can feasibly fit on this small site which dictates the the degree of betterment we can provide, however it would be helpful if you could provide further clarification of the minimum percentage betterment requirement the council expects to see as a starting point. We will be liaising with Anglian Water regarding discharge rates into the foul sewer when we are appointed to undertake the FRA.

Kind regards,

Michael Hartley
Assistant Engineer
For and on behalf of Peter Brett Associates LLP - Cambridge
Hi Michael,

Yes, the FRA will be required as it’s waste development even it’s already there. Also as a part of new development proposals, you will need to try and provide some betterment in terms of Discharge rate to match greenfield rates and if not at least about 50 to 80% betterment.

Hope the above is helpful. Please do not hesitate to contact us should you have any queries with regards to the above.

Kind Regards,

Pankit Shah
Principal Project Engineer

Surface Water Drainage Assessment Team

Phone: 01604 364306
Email: swdrainage@northamptonshire.gov.uk
Web: www.floodtoolkit.com

Good Morning Pankit,

Thank you very much for your detailed response. So I take it a FRA is required as this is a waste development? The reason I ask is because there is a waste development already there and the development proposals comprise the redevelopment of the waste facility.

Kind regards,

Michael Hartley
Assistant Engineer
For and on behalf of Peter Brett Associates LLP - Cambridge
Dear Michael,

Thank you for consulting us on the above pre-planning application.

Please note that in its role as a statutory consultee to the planning application process, Northamptonshire County Council (as the Lead Local Flood Authority) only has a legal responsibility to provide advice on surface water drainage matters for major development as defined by Section 62A(2) of the 1990 Town and County Planning Act. With reference to the above, our information requirements in support of any planning application are outlined in our document Local Standards and Guidance for Surface Water Drainage in Northamptonshire document: https://www.floodtoolkit.com/wp-content/uploads/2016/08/Local-Standards-v1.1-August-2016.pdf.

In view of above, a Flood Risk Assessment and/or Drainage Strategy will be required if your development is a MAJOR development as per the definition below:

The definition of “Major development” is taken from the Town and Country Planning Act as development involving any one or more of the following:

(a) The winning and working of minerals or the use of land for mineral-working deposits;

(b) Waste development;

(c) The provision of dwelling houses where:
   (i) the number of dwelling houses to be provided is 10 or more; or
   (ii) the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);

(d) The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more;

Or

(e) Development carried out on a site having an area of 1 hectare or more;

Hope the above is helpful. Please do not hesitate to contact us should you have any queries with regards to the above.

Kind Regards,

Pankit Shah
Principal Project Engineer

Surface Water Drainage Assessment Team

Phone: 01604 364306
Email: swdrainage@northamptonshire.gov.uk
Web: www.floodtoolkit.com
From: Michael Hartley [mailto:mhartley@peterbrett.com]
Sent: 14 September 2017 15:24
To: Surface Water Drainage Assessment Team <swdrainage@northamptonshire.gov.uk>
Cc: Robin Clarke <rclarke@peterbrett.com>
Subject: High March Waste Transfer Depot, Daventry Flood Risk and Drainage Query

PLEASE FORWARD THIS ENQUIRY TO FLOOD RISK/DRAINAGE OFFICER

Dear Sir/Madam,

Peter Brett Associates are providing pre-planning support (detailed application) for the redevelopment of a waste transfer station. The proposed works is located south of Daventry at NGR: 458108E, 261699N. Nearest Post Code NN11 4EZ. An image showing location of site shown below. A proposed development plan attached. The development includes two main structures, a new 2 bay workshop and a new Waste transfer building. It will involve no change in use there will be no change in impermeable area. The existing drainage system will be utilised where feasible.

![Location Map](image_url)

The planning officer for the proposed development stated that a Flood Risk Assessment is required as part of the site is shown in Flood Zone 2. However our initial review suggests the whole site is located in Flood Zone 1 and that the proposal is less than 1 hectare in size. EA flood map extracts including fluvial flood map for the site attached for your reference.
We would be grateful if you could clarify what level of information NCC, as the lead local flood authority, expects to see with regards to flood risk and drainage for this site. Also, we would be grateful if you could confirm whether a hydrological assessment and/or a Hydrogeological assessment is required to support this planning application.

Thank you

Kind regards,

Michael Hartley
Assistant Engineer
For and on behalf of Peter Brett Associates LLP - Cambridge

01223802952
mhartley@peterbrett.com
peterbrett.com

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----------------------------------------------------------------------------
2) AN IMPACT ASSESSMENT TO DEMONSTRATE THAT THE NATURE AND SCALE OF LEISURE, RETAIL AND/OR EMPLOYMENT DEVELOPMENT IS APPROPRIATE FOR THE LOCATION AND WOULD NOT ADVERSELY AFFECT THE VITALITY AND VIABILITY OF EXISTING TOWN CENTRES OR THE ABILITY TO SECURE INVESTMENT AND REVITALISATION IN THEM.

3) A TRANSPORT ASSESSMENT TO ENSURE THAT SUFFICIENT CAPACITY EXISTS ON THE STRATEGIC AND LOCAL HIGHWAY NETWORKS AND THAT FULL OPPORTUNITIES ARE TAKEN TO ACCESS THE SITE BY NON-CAR MODES.

DEVELOPMENT PROPOSALS SHOULD BE ACCOMPANIED BY A MASTERPLAN PREPARED IN CONSULTATION WITH THE DISTRICT PLANNING AUTHORITY, LOCAL COMMUNITY AND OTHER INTERESTED PARTIES INCLUDING THE HIGHWAY AUTHORITIES FOR THE NEARBY ROADS.

Water Resources, Water Quality and Flood Risk Management

10.47 Development can have a significant impact on water resources, from putting additional strain on existing supplies, to affecting flood patterns by changing both the way that water flows across and percolates into land. It is essential to protect and enhance the quality and quantity of both ground and surface water, ensure necessary service provision, conserve water supplies and manage flood risk.

10.48 New developments will need to have the necessary means of water supply but this must not affect the water levels at the Upper Nene Valley Gravel Pits Special Protection Area (SPA) or overall water quality. In conformity with the Water Framework Directive, specific standards for new development in respect of water resources and quality are detailed in the Sustainable Development Principles Policy (Policy S10) in the Spatial Strategy in Section 5 of this JCS and are reflected within the Infrastructure Schedule in Appendix 4; these are essential in ensuring sustainable development and protecting the area’s high water quality.

10.49 Due to the potential effects of climate change there is an increasing need for local authorities to appraise, manage and reduce flood risk from all sources. In accordance with the sequential test and principles of the National Planning Policy Framework and national Planning Practice Guidance, development will be steered away from areas of greatest risk and, where this is not possible, flood risk management will be required to make development safe.

10.50 Flood risk and water quality are significant concerns for West Northamptonshire. The Rivers Nene, Tove and Ouse and their tributaries as well as the canal network and reservoirs are prominent features of the landscape and important to wider biodiversity and leisure networks. Yet due to these water bodies and
historic patterns of development there are a number of areas which are at risk of flooding. In addition to fluvial flooding there is also an increased risk of surface water flooding following periods of heavy rainfall, more intense storms and/or where wastewater drainage is ineffective.

10.51 The Flood and Water Management Act (2010) gives Northamptonshire County Council (NCC) a lead responsibility in relation to all local flooding issues. NCC is also the SuDS Approval Body (SAB) that has responsibility for the assessment and approval of all surface water drainage systems. The Water Cycle Study\(^\text{11}\) (WCS) gives guidance on the likely suitability of different SuDS methods.

10.52 All new developments will need to demonstrate that they have regard to existing and future flood patterns and that the need for effective protection and flood risk management measures from all sources, such as sustainable drainage systems and opportunities for strategic flood storage have been considered, this is particularly important in areas that are vulnerable to flooding. All SUEs will require site specific flood risk assessments and the WCS contains guidance to inform these assessments.

10.53 Some development has historically also had a negative impact on water quality, due to run-off from hard surfaces or other changes to the water cycle. In order to meet the requirements of the Water Framework Directive\(^\text{12}\), a statutory duty has been placed on local authorities to ensure that development creates no detriment to the water quality and in some cases can improve water quality as well as providing benefits such as flood risk management and to biodiversity.

10.54 Most of West Northamptonshire's water bodies achieve good ecological status. The WCS has identified the impacts of the proposed new development on water quality and concluded that although there are still water quality issues, these issues remain even without the new development proposed in the JCS and in most cases, it is not possible to maintain good status, even if wastewater treatment works were upgraded to the best that can be achieved with current technology.

10.55 Given these issues, that are widespread across the UK, and would be an issue even without any development, various initiatives are underway to address the problem, including a new River Nene Partnership Project. It is vital that the JCS ensures that all new development reduces the risk of impacts on water quality and removes or mitigates as much as possible the risk of non-compliance with the Water Framework Directive. Policy S10 Sustainable Development Principles together with Policy BN7A sets out how it is expected that development will have regard to these risks and to propose a combination of effective wastewater infrastructure, extensive use of SuDS and high standards of water efficiency in

\(^{11}\) West Northamptonshire Water Cycle Study: Pre-Submission Joint Core Strategy Detailed WCS Final report September 2011

the Code for Sustainable Homes, or equivalent national standard, to address water quality issues.

10.56 A Level 1 Strategic Flood Risk Assessment (SFRA) has been undertaken for the plan area. This describes and analyses how the area is affected by flood risk and the nature of that risk. More detailed Level 2 Strategic Flood Risk Assessments for Northampton\(^{13}\), South Northamptonshire and Daventry District\(^{14}\) have also been completed and provide additional information for areas at risk of flooding where development pressures exist or may exist in the future. Sitting alongside these documents is the West Northamptonshire Water Cycle Strategy for the whole area, which provides the evidence of the impact of development on water quality and supply, in addition to a specific drainage plan for the Central Area of Northampton, which has particular issues due to the age and construction of the infrastructure.

10.57 In order to assist in the area’s resilience to future flooding events new development should help achieve the long-term flood management goals set out in the River Nene\(^{15}\), the River Ouse\(^{16}\) and the River Thames\(^{17}\) Catchment Flood Management Plans (CFMPs), produced by the Environment Agency. This includes constructing defences to the appropriate standard as required by the Environment Agency, which may be greater than the minimum requirements, and where appropriate, secured in perpetuity.

10.58 Development will be required to take account of the Sequential and Exception Tests as set out in the NPPF and the national Planning Practice Guidance. The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Table 6, below, details the approach that will need to be taken for each flood zone. A fuller explanation of what constitutes essential infrastructure, water compatible, highly vulnerable, more vulnerable, and less vulnerable is set out within the national Planning Practice Guidance.

\(^{13}\) Scott Wilson (2010) Northampton Level 2 Strategic Flood Risk Assessment

\(^{14}\) Scott Wilson (2009), Daventry and South Northamptonshire Level 2 Strategic Flood Risk Assessment

\(^{15}\) Environment Agency (2009), River Nene Catchment Flood Management Plan Summary Report: Peterborough

\(^{16}\) Environment Agency (2010), River Ouse Catchment Flood Management Plan Summary Report: Leeds

\(^{17}\) Environment Agency (2009), River Thames catchment Flood Management Plan Summary Report: Reading
### Table 6: Exception Test

<table>
<thead>
<tr>
<th>Flood Risk Vulnerability</th>
<th>Essential Infrastructure</th>
<th>Water Compatible</th>
<th>Highly Vulnerable</th>
<th>More Vulnerable</th>
<th>Less Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>Development is appropriate</td>
<td>Development is appropriate</td>
<td>Development is appropriate</td>
<td>Development is appropriate</td>
<td>Development is appropriate</td>
</tr>
<tr>
<td>Zone 2</td>
<td>Development is appropriate</td>
<td>Development is appropriate</td>
<td>Exception Test required</td>
<td>Development is appropriate</td>
<td>Development is appropriate</td>
</tr>
<tr>
<td>Zone 3a</td>
<td>Exception Test required</td>
<td>Development is appropriate</td>
<td>Development should not be permitted</td>
<td>Development test required</td>
<td>Development is appropriate</td>
</tr>
<tr>
<td>Zone 3b</td>
<td>Exception Test required</td>
<td>Development is appropriate</td>
<td>Development should not be permitted</td>
<td>Development test required</td>
<td>Development should not be permitted</td>
</tr>
</tbody>
</table>

NB This table does not show the application of the Sequential Test which guides development to Flood Zone 1 first then Flood Zone 2 and then Flood Zone 3; Flood Risk Assessment requirements or policy aims for each Flood Zone.

**POLICY BN7A - WATER SUPPLY, QUALITY AND WASTEWATER INFRASTRUCTURE**

NEW DEVELOPMENT PROPOSALS WILL ENSURE THAT ADEQUATE AND APPROPRIATE WATER SUPPLY AND WASTEWATER INFRASTRUCTURE IS AVAILABLE TO MEET THE ADDITIONAL REQUIREMENTS PLACED UPON IT AND TO ENSURE THAT WATER QUALITY IS PROTECTED, AND AS FAR AS IS PRACTICABLE, IMPROVED.

DEVELOPMENT PROPOSALS WILL ENSURE THAT ADEQUATE WASTEWATER TREATMENT CAPACITY IS AVAILABLE TO ADDRESS CAPACITY AND ENVIRONMENTAL CONSTRAINTS.

DEVELOPMENT SHOULD USE SUSTAINABLE DRAINAGE SYSTEMS, WHEREVER PRACTICABLE, TO IMPROVE WATER QUALITY, REDUCE FLOOD RISK AND PROVIDE ENVIRONMENTAL AND ADAPTATION BENEFITS.

TO ENSURE ALL NEW HOUSING IS WATER EFFICIENT ALL NEW DEVELOPMENT WILL BE REQUIRED TO ACHIEVE THE EQUIVALENT OF MINIMUM LEVEL 4 STANDARDS FOR WATER CONSERVATION IN THE CODE FOR SUSTAINABLE HOMES OR ANY NATIONAL EQUIVALENT STANDARD FROM 2016.
POLICY BN7 - FLOOD RISK

DEVELOPMENT PROPOSALS WILL COMPLY WITH FLOOD RISK ASSESSMENT AND MANAGEMENT REQUIREMENTS SET OUT IN THE NATIONAL PLANNING POLICY FRAMEWORK AND PLANNING PRACTICE GUIDANCE AND THE WEST NORTHAMPTONSHIRE STRATEGIC FLOOD RISK ASSESSMENTS TO ADDRESS CURRENT AND FUTURE FLOOD RISKS WITH APPROPRIATE CLIMATE CHANGE ALLOWANCES.

A SEQUENTIAL APPROACH WILL BE APPLIED TO ALL PROPOSALS FOR DEVELOPMENT IN ORDER TO DIRECT DEVELOPMENT TO AREAS AT THE LOWEST PROBABILITY OF FLOODING UNLESS IT HAS MET THE REQUIREMENTS OF THE SEQUENTIAL TEST AND THE EXCEPTION TEST AS SET OUT WITHIN TABLE 6.

ALL NEW DEVELOPMENT, INCLUDING REGENERATION PROPOSALS, WILL NEED TO DEMONSTRATE THAT THERE IS NO INCREASED RISK OF FLOODING TO EXISTING PROPERTIES, AND PROPOSED DEVELOPMENT IS (OR CAN BE) SAFE AND SHALL SEEK TO IMPROVE EXISTING FLOOD RISK MANAGEMENT.

ALL PROPOSALS FOR DEVELOPMENT OF 1 HECTARE OR ABOVE IN FLOOD ZONE 1 AND FOR DEVELOPMENT IN 2, 3A OR 3B MUST BE ACCOMPANIED BY A FLOOD RISK ASSESSMENT THAT SETS OUT THE MITIGATION MEASURES FOR THE SITE AND AGREED WITH THE RELEVANT AUTHORITY.

A FLOOD RISK ASSESSMENT MUST ALSO ACCOMPANY PROPOSALS WHERE IT MAY BE SUBJECT TO OTHER SOURCES, AND FORMS, OF FLOODING OR WHERE OTHER BODIES HAVE INDICATED THAT THERE MAY BE DRAINAGE PROBLEMS.

IN ORDER TO MEET THE EXCEPTION TEST DEVELOPMENT MUST:

1) DEMONSTRATE THAT THE DEVELOPMENT PROVIDES WIDER SUSTAINABILITY BENEFITS TO THE COMMUNITY THAT OUTWEIGH THE FLOOD RISK;
2) BE LOCATED ON PREVIOUSLY DEVELOPED LAND; AND
3) BE ACCOMPANIED BY A SITE SPECIFIC FLOOD RISK ASSESSMENT THAT DEMONSTRATES THAT THE DEVELOPMENT WILL BE SAFE FOR ITS LIFETIME WITHOUT INCREASING FLOOD RISK ELSEWHERE AND WHERE POSSIBLE, REDUCE FLOOD RISK OVERALL.

WHERE FLOOD RISK MANAGEMENT REQUIRES THE USE OF SUSTAINABLE DRAINAGE SYSTEMS TO MANAGE SURFACE WATER RUN-OFF, THESE SHOULD:

a) SEPARATE SURFACE WATER FROM FOUL AND COMBINED SEwers;
Dear Michael,

Apologies for not getting back to you sooner, I have a long backlog of email and regrettably do miss correspondence.

I can confirm that the District Council has no records of this site having been subject to surface water flooding. To the best of my knowledge there have been no instances of flooding from sewers or the highway either but if you have not already done so I suggest you contact Anglian Water and Northamptonshire County Council separately in their roles as sewerage undertaker and Lead Local Flood Authority respectively.

Yours,

Steve Whelton
BEng IEng MICE
Engineer (Infrastructure & Buildings)

Tel: 01327 302445
Mob: 07876 475694

From: CallPC2 On Behalf Of Customer Care
Sent: 27 September 2017 15:24
To: Steve Whelton
Subject: FW: High March Waste Transfer Depot- Flood Risk Information Data Request

Customer Services
Daventry District Council
Lodge Road
Daventry
Northants
NN11 4FP

Telephone Number: 01327 871100

Website: www.daventrydc.gov.uk
FOR THE ATTENTION OF THE FLOOD RISK/DRAINAGE ENGINEER

Dear Sir/Madam,

Peter Brett Associates are carrying out a Flood Risk Assessment for the proposed redevelopment of High March Waste Transfer Depot located in Daventry, Northamptonshire. The site is centred at 458097E, 261709N. Nearest Post Code: NN11 4QB. A location plan is attached.

Could you please provide us with any information in your possession regarding any incidences of, or possible problems with, flooding in the area of the site?

We also also in contact with Northamptonshire District Council, Environment Agency and Anglian Water.

Thank you for your assistance. If you require any further information please contact myself on this contact email address.

Kind regards,

Michael Hartley
Assistant Engineer
For and on behalf of Peter Brett Associates LLP - Cambridge

01223802952
mhartley@peterbrett.com
peterbrett.com
Daventry District Council is committed to the concept and practice of sustainable development.

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**************************************************************************************************

This message has been scanned for viruses by Websense

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Appendix F  SFRA Records
Appendix G  Proposed Development Plan
Appendix H  Surface Water Drainage Calculations
# Time Area Diagram for Storm

<table>
<thead>
<tr>
<th>Time (mins)</th>
<th>Area (ha)</th>
<th>Time (mins)</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>0.283</td>
<td>4-8</td>
<td>0.202</td>
</tr>
</tbody>
</table>

Total Area Contributing (ha) = 0.485

Total Pipe Volume (m³) = 3.243
# Existing Network Details for Storm

- Indicates pipe length does not match coordinates

<table>
<thead>
<tr>
<th>PN</th>
<th>Length (m)</th>
<th>Fall (m)</th>
<th>Slope (1:X)</th>
<th>I.Area (ha)</th>
<th>T.E. (mins)</th>
<th>Base Flow (l/s)</th>
<th>k (mm)</th>
<th>HYD SECT</th>
<th>DIA (mm)</th>
<th>Section Type</th>
</tr>
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<tbody>
<tr>
<td>1.000</td>
<td>27.648</td>
<td>0.850</td>
<td>32.5</td>
<td>0.485</td>
<td>5.00</td>
<td>0.0</td>
<td>0.600</td>
<td>0</td>
<td>150</td>
<td>Pipe/Conduit</td>
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<tr>
<td>1.001</td>
<td>1.308</td>
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<td>0.00</td>
<td>0.0</td>
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<td>150</td>
<td>Pipe/Conduit</td>
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<tr>
<td>1.002</td>
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<td>0.800</td>
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<td>0.0</td>
<td>0.600</td>
<td>0</td>
<td>225</td>
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</tbody>
</table>

**Network Results Table**

<table>
<thead>
<tr>
<th>PN</th>
<th>US/IL (m)</th>
<th>Σ I.Area (ha)</th>
<th>Σ Base Flow (l/s)</th>
<th>Vel (m/s)</th>
<th>Cap (l/s)</th>
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<tbody>
<tr>
<td>1.000</td>
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<tr>
<td>MH Name</td>
<td>MH CL (m)</td>
<td>MH Depth (m)</td>
<td>MH Connection</td>
<td>MH Diam., L*W (mm)</td>
<td>Pipe Out PN</td>
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<tr>
<td>---------</td>
<td>-----------</td>
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<td>----------------</td>
<td>-------------------</td>
<td>-------------</td>
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<tr>
<td>1</td>
<td>156.040</td>
<td>1.190</td>
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<td>1200</td>
<td>1.000</td>
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<td>2</td>
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<td>4.320</td>
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<tr>
<td>3</td>
<td>156.150</td>
<td>4.410</td>
<td>Open Manhole</td>
<td>1200</td>
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<td>156.150</td>
<td>5.210</td>
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<td>OUTFALL</td>
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### Area Summary for Storm

<table>
<thead>
<tr>
<th>Pipe Number</th>
<th>PIMP</th>
<th>Type</th>
<th>Gross Area (ha)</th>
<th>Imp. Area (ha)</th>
<th>Pipe Total (ha)</th>
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</thead>
<tbody>
<tr>
<td>1.000</td>
<td>-</td>
<td>-</td>
<td>0.485</td>
<td>0.485</td>
<td>0.485</td>
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<tr>
<td>1.001</td>
<td>-</td>
<td>-</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>1.002</td>
<td>-</td>
<td>-</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
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</tbody>
</table>

**Total**

<table>
<thead>
<tr>
<th>Gross Area (ha)</th>
<th>Imp. Area (ha)</th>
<th>Pipe Total (ha)</th>
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</thead>
<tbody>
<tr>
<td>0.485</td>
<td>0.485</td>
<td>0.485</td>
</tr>
</tbody>
</table>

### Free Flowing Outfall Details for Storm

<table>
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<tr>
<th>Pipe Number</th>
<th>Outfall Name</th>
<th>C. Level (m)</th>
<th>I. Level (m)</th>
<th>Min I. Level (m)</th>
<th>D,L W</th>
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<tbody>
<tr>
<td>1.002</td>
<td></td>
<td>156.150</td>
<td>150.940</td>
<td>0.000</td>
<td>0</td>
</tr>
</tbody>
</table>

### Simulation Criteria for Storm

- **Volumetric Runoff Coeff**: 0.750
- **Additional Flow - % of Total Flow**: 0.000
- **Areal Reduction Factor**: 1.000
- **MADD Factor * 10m³/ha Storage**: 2.000
- **Hot Start (mins)**: 0
- **Inlet Coefficient**: 0.800
- **Hot Start Level (mm)**: 0
- **Flow per Person per Day (l/per/day)**: 0.000
- **Manhole Headloss Coeff (Global)**: 0.500
- **Run Time (mins)**: 60
- **Foul Sewage per hectare (l/s)**: 0.000
- **Output Interval (mins)**: 1

### Synthetic Rainfall Details

- **Rainfall Model**: FEH
- **Return Period (years)**: 2
- **Site Location**: GB 457700 262150 SP 57700 62150
- **C (1km)**: -0.025
- **D1 (1km)**: 0.359
- **D2 (1km)**: 0.293
- **D3 (1km)**: 0.233
- **E (1km)**: 0.298
- **F (1km)**: 2.538
- **Summer Storms**: Yes
- **Winter Storms**: Yes
- **Cv (Summer)**: 0.750
- **Cv (Winter)**: 0.840
- **Storm Duration (mins)**: 30
### 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

#### Simulation Criteria
- **Areal Reduction Factor**: 1.000
- **Additional Flow - % of Total Flow**: 0.000
- **Hot Start (mins)**: 0
- **MADD Factor * 10m³/ha Storage**: 2.000
- **Hot Start Level (mm)**: 0
- **Inlet Coefficient**: 0.800
- **Manhole Headloss Coeff (Global)**: 0.500
- **Flow per Person per Day (l/per/day)**: 0.000
- **Foul Sewage per hectare (l/s)**: 0.000

#### Number of Input Hydrographs: 0  Number of Storage Structures: 0
- Number of Online Controls: 0  Number of Time/Area Diagrams: 0  Number of Offline Controls: 0  Number of Real Time Controls: 0

#### Synthetic Rainfall Details
- **Rainfall Model**: FEH
- **Site Location**: GB 457700 262150 SP 57700 62150
- **C (1km)**: -0.025
- **D1 (1km)**: 0.359
- **D2 (1km)**: 0.293
- **D3 (1km)**: 0.233
- **E (1km)**: 0.298
- **F (1km)**: 2.538
- **Cv (Summer)**: 0.840
- **Cv (Winter)**: 0.840

#### Margin for Flood Risk Warning (mm): 300.0  **DVD Status**: OFF
- **Analysis Timestep**: Fine  **Inertia Status**: OFF  **DTS Status**: ON

#### Profile(s)**: Summer and Winter  **Duration(s) (mins)**: 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440  **Return Period(s) (years)**: 1, 30, 200  **Climate Change (%)**: 0, 0, 40

#### Water Level

<table>
<thead>
<tr>
<th>US/MH</th>
<th>Name</th>
<th>Storm</th>
<th>Return Period</th>
<th>Climate Change</th>
<th>First (X)</th>
<th>First (Y)</th>
<th>First (Z)</th>
<th>Overflow</th>
<th>Act. Water Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.000</td>
<td>1</td>
<td>15 Summer</td>
<td>1</td>
<td>+0%</td>
<td>1/15 Summer</td>
<td>30/15 Summer</td>
<td></td>
<td></td>
<td>155.739</td>
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<tr>
<td>1.001</td>
<td>2</td>
<td>15 Summer</td>
<td>1</td>
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<td>1/15 Summer</td>
<td></td>
<td></td>
<td></td>
<td>152.313</td>
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<tr>
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<td>15 Summer</td>
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<td></td>
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<td>151.886</td>
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#### Surcharged Flooded

<table>
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<tr>
<th>US/MH</th>
<th>Name</th>
<th>Depth</th>
<th>Volume</th>
<th>Flow / Overflow</th>
<th>Flow</th>
<th>Cap.</th>
<th>Status</th>
<th>Exceeded</th>
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<td>0.739</td>
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<td>1.37</td>
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<td>40.9</td>
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<tr>
<td>1.001</td>
<td>2</td>
<td>0.383</td>
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<td>3.25</td>
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### 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

**Simulation Criteria**
- Areal Reduction Factor: 1.000
- Additional Flow - % of Total Flow: 0.000
- Hot Start (mins): 0
- MADD Factor * 10m³/ha Storage: 2.000
- Hot Start Level (mm): 0
- Inlet Coefficient: 0.800
- Manhole Headloss Coeff (Global): 0.500
- Flow per Person per Day (l/per/day): 0.000
- Foul Sewage per hectare (l/s): 0.000

**Synthetic Rainfall Details**
- Rainfall Model: FEH
- Site Location: GB 457700 262150 SP 57700 62150
- C (1km): -0.025
- D1 (1km): 0.359
- D2 (1km): 0.293
- D3 (1km): 0.233
- E (1km): 0.298
- F (1km): 2.538
- Cv (Summer): 0.840
- Cv (Winter): 0.840

- Margin for Flood Risk Warning (mm): 300.0
- Analysis Timestep: Fine
- Inertia Status: OFF
- DTS Status: ON

**Profile(s)**: Summer and Winter
- Duration(s) (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
- Return Period(s) (years): 1, 30, 200
- Climate Change (%): 0, 0, 40

### Water Level

<table>
<thead>
<tr>
<th>US/MH</th>
<th>Name</th>
<th>Storm</th>
<th>Return</th>
<th>Climate Change</th>
<th>First (X)</th>
<th>First (Y)</th>
<th>First (Z)</th>
<th>Overflow Act.</th>
<th>Water Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.000</td>
<td>1</td>
<td>15 Summer</td>
<td>30</td>
<td>+0%</td>
<td>1/15 Summer</td>
<td>30</td>
<td>1/15 Summer 30/15 Summer</td>
<td>156.087</td>
<td></td>
</tr>
<tr>
<td>1.001</td>
<td>2</td>
<td>15 Summer</td>
<td>30</td>
<td>+0%</td>
<td>1/15 Summer</td>
<td>30</td>
<td>1/15 Summer 30/15 Summer</td>
<td>152.419</td>
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<td>15 Summer</td>
<td>30</td>
<td>+0%</td>
<td>1/15 Summer</td>
<td>30</td>
<td>1/15 Summer 30/15 Summer</td>
<td>151.897</td>
<td></td>
</tr>
</tbody>
</table>

### Surcharged Flooded Pipe

<table>
<thead>
<tr>
<th>PN</th>
<th>Name</th>
<th>Depth (m)</th>
<th>Volume (m³)</th>
<th>Flow / Overflow (l/s)</th>
<th>Status</th>
<th>Level Exceeded</th>
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<td>0.000</td>
<td>0.83</td>
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</table>

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### 200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

#### Simulation Criteria
- Areal Reduction Factor: 1.000
- Additional Flow - % of Total Flow: 0.000
- Hot Start (mins): 0
- MADD Factor * 10m³/ha Storage: 2.000
- Hot Start Level (mm): 0
- Inlet Coefficient: 0.800
- Manhole Headloss Coeff (Global): 0.500
- Flow per Person per Day (l/per/day): 0.000
- Foul Sewage per hectare (l/s): 0.000

#### Synthetic Rainfall Details
- Rainfall Model: FEH
- Site Location: GB 457700 262150 SP 57700 62150
- C (1km): -0.025
- D1 (1km): 0.359
- D2 (1km): 0.293
- D3 (1km): 0.233
- E (1km): 0.298
- F (1km): 2.538
- Cv (Summer): 0.840
- Cv (Winter): 0.840

- Margin for Flood Risk Warning (mm): 300.0
- DVD Status: OFF
- Analysis Timestep: Fine
- Inertia Status: OFF
- DTS Status: ON

#### Profile(s)
- Summer and Winter

#### Duration(s) (mins)
- 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

#### Return Period(s) (years)
- 1, 30, 200

#### Climate Change (%)
- 0, 0, 40

<table>
<thead>
<tr>
<th>Storm</th>
<th>Return Period</th>
<th>Climate Change (%)</th>
<th>First (X)</th>
<th>First (Y)</th>
<th>First (Z)</th>
<th>Overflow Act.</th>
<th>Water Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>200 +40% Summer 30/15</td>
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<td>30/15 Summer</td>
<td>156.246</td>
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</tr>
<tr>
<td>Winter</td>
<td>200 +40%</td>
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<td>152.466</td>
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<td>Winter</td>
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<td>151.902</td>
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<table>
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<th>Storm</th>
<th>Climate Change (%)</th>
<th>Surcharge Depth</th>
<th>Overflow Volume</th>
<th>Flow / Overflow Flow</th>
<th>Cap. Status Exceeded</th>
<th>Pipe Surcharged Flooded</th>
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<tbody>
<tr>
<td>1.000</td>
<td>1 30 Winter</td>
<td>200 +40% Summer 30/15</td>
<td>1.246</td>
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<td>0.536</td>
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<td>0.000</td>
<td>0.86</td>
<td>47.1</td>
<td>OK</td>
</tr>
</tbody>
</table>

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### Time Area Diagram for Storm

<table>
<thead>
<tr>
<th>Time (mins)</th>
<th>Area (ha)</th>
<th>Time (mins)</th>
<th>Area (ha)</th>
</tr>
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<tbody>
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<td>0-4</td>
<td>0.397</td>
<td>4-8</td>
<td>0.144</td>
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Total Area Contributing (ha) = 0.541

Total Pipe Volume (m³) = 17.487
### Existing Network Details for Storm

<table>
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<tr>
<th>PN</th>
<th>Length (m)</th>
<th>Fall (m)</th>
<th>Slope (1:X)</th>
<th>I.Area (ha)</th>
<th>T.E. (mins)</th>
<th>Base Flow (l/s)</th>
<th>k (mm)</th>
<th>HYD SECT (mm)</th>
<th>DIA (mm)</th>
<th>Section Type</th>
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</thead>
<tbody>
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### Network Results Table

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<th>Cap (l/s)</th>
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<th>Imp. Area (ha)</th>
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Free Flowing Outfall Details for Storm

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<th>C. Level (m)</th>
<th>I. Level (m)</th>
<th>Min I. Level (m)</th>
<th>D,L (mm)</th>
<th>W (mm)</th>
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Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750  
Additional Flow - % of Total Flow 0.000  
Areal Reduction Factor 1.000  
MADD Factor * 10m³/ha Storage 2.000  
Hot Start (mins) 0  
Inlet Coefficient 0.800  
Hot Start Level (mm) 0  
Flow per Person per Day (l/per/day) 0.000  
Manhole Headloss Coeff (Global) 0.500  
Run Time (mins) 60  
Foul Sewage per hectare (l/s) 0.000  
Output Interval (mins) 1

Number of Input Hydrographs 0  
Number of Offline Controls 0  
Number of Time/Area Diagrams 0  
Number of Online Controls 1  
Number of Storage Structures 1  
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH  
Return Period (years) 100  
Site Location GB 457700 262150 SP 57700 62150  
C (1km) -0.025  
D1 (1km) 0.359  
D2 (1km) 0.293  
D3 (1km) 0.233  
E (1km) 0.298  
F (1km) 2.538  
Summer Storms Yes  
Winter Storms Yes  
Cv (Summer) 0.750  
Cv (Winter) 0.840  
Storm Duration (mins) 30
Online Controls for Storm

Hydro-Brake Optimum® Manhole: 8, DS/PN: 1.003, Volume (m³): 6.5

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<th>Control Points</th>
<th>Head (m)</th>
<th>Flow (l/s)</th>
<th>Control Points</th>
<th>Head (m)</th>
<th>Flow (l/s)</th>
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The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated.

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### Storage Structures for Storm

**Cellular Storage Manhole: 8, DS/PN: 1.003**

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### 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

**Simulation Criteria**
- Areal Reduction Factor 1.000
- Additional Flow - % of Total Flow 0.000
- Hot Start (mins) 0
- MADD Factor * 10m³/ha Storage 2.000
- Manhole Headloss Coeff (Global) 0.500
- Inlet Coefficient 0.800
- Flow per Person per Day (l/per/day) 0.000
- Foul Sewage per hectare (l/s) 0.000
- Margin for Flood Risk Warning (mm) 300.0
- DVD Status OFF
- Analysis Timestep Fine
- Inertia Status OFF
- DTS Status ON
- Profile(s) Summer and Winter
- Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
- Return Period(s) (years) 1, 30, 200
- Climate Change (%) 0, 0, 40

### Synthetic Rainfall Details
- Rainfall Model FEH
- Site Location GB 457700 262150 SP 57700 62150
- CV (Summer) 0.840
- CV (Winter) 0.840
- Margin for Flood Risk Warning (mm) 300.0
- DVD Status OFF
- Analysis Timestep Fine
- Inertia Status OFF
- DTS Status ON

### Water Level

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<th>Return Period</th>
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<th>First (Y)</th>
<th>First (Z)</th>
<th>Overflow</th>
<th>Act.</th>
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### 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

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### 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

**Simulation Criteria**

- Areal Reduction Factor: 1.000
- Additional Flow - % of Total Flow: 0.000
- Hot Start (mins): 0
- MADD Factor * 10m³/ha Storage: 2.000
- Hot Start Level (mm): 0
- Inlet Coefficient: 0.800
- Manhole Headloss Coeff (Global): 0.500
- Flow per Person per Day (l/per/day): 0.000
- Foul Sewage per hectare (l/s): 0.000
- Number of Input Hydrographs: 0
- Number of Offline Controls: 0
- Number of Time/Area Diagrams: 0
- Number of Online Controls: 1
- Number of Storage Structures: 1
- Number of Real Time Controls: 0

**Synthetic Rainfall Details**

- Rainfall Model: FEH D3 (1km) 0.233
- Site Location: GB 457700 262150 SP 57700 62150 E (1km) 0.298
- C (1km): -0.025
- D1 (1km): 0.359 Cv (Summer) 0.840
- D2 (1km): 0.293 Cv (Winter) 0.840

- Margin for Flood Risk Warning (mm): 300.0
- DVD Status: OFF
- Analysis Timestep: Fine
- Inertia Status: OFF
- DTS Status: ON
- Profile(s): Summer and Winter
- Duration(s) (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
- Return Period(s) (years): 1, 30, 200
- Climate Change (%): 0, 0, 40

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<th>First (Y)</th>
<th>First (Z)</th>
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<table>
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<tr>
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<th>Pipe</th>
<th>Water</th>
</tr>
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<tr>
<td>PN</td>
<td>Name</td>
<td>(m)</td>
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<tr>
<td>PN 1000</td>
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<td>0.519</td>
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<tr>
<td>PN 2000</td>
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<td>PN 1001</td>
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<td>PN 3000</td>
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### 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

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<th>Level</th>
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<tbody>
<tr>
<td>US/MH</td>
<td>Depth (m)</td>
<td>Volume (m³)</td>
<td>Flow / Overflow (l/s)</td>
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<td>0.516</td>
<td>0.000</td>
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</tbody>
</table>
200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

**Simulation Criteria**
- Areal Reduction Factor: 1.000
- Additional Flow: 0.000% of Total Flow
- Hot Start (mins): 0
- MADD Factor: 10m³/ha Storage: 2.000
- Hot Start Level (mm): 0
- Inlet Coefficient: 0.000
- Manhole Headloss Coeff (Global): 0.500
- Flow per Person per Day: 0.000
- Foul Sewage per hectare: 0.000
- Number of Input Hydrographs: 0
- Number of Offline Controls: 0
- Number of Time/Area Diagrams: 0
- Number of Online Controls: 1
- Number of Storage Structures: 1
- Number of Real Time Controls: 0

**Synthetic Rainfall Details**
- Rainfall Model: FEH D3 (1km)
- Site Location: GB 457700 262150 SP 57700 62150 E (1km)
- C (1km): -0.025
- D1 (1km): 0.359
- D2 (1km): 0.293

**Margin for Flood Risk Warning (mm):** 300.0
**DVD Status:** OFF
**Analysis Timestep:** Fine
**Inertia Status:** OFF
**DTS Status:** ON

**Profile(s):** Summer and Winter
**Duration(s) (mins):** 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

**Return Period(s) (years):** 1, 30, 200
**Climate Change (%):** 0, 0, 40

### PN US/MH Name Storm Return Climate Period Change First (X) First (Y) First (Z) Overflow Overflow Act. Water Level

<table>
<thead>
<tr>
<th>PN</th>
<th>Name</th>
<th>Storm</th>
<th>Period</th>
<th>Change</th>
<th>Surcharge</th>
<th>Flood</th>
<th>Overflow</th>
<th>Act.</th>
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<td>15 Summer</td>
<td>200</td>
<td>+40%</td>
<td>30/15 Summer</td>
<td>200/15 Summer</td>
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<tr>
<td>2.000</td>
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<td>+40%</td>
<td>30/15 Summer</td>
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<td>200</td>
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<td>200/15 Summer</td>
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<tr>
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<td>200/15 Summer</td>
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<td>180 Winter</td>
<td>200</td>
<td>+40%</td>
<td>1/15 Summer</td>
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### Surcharged Flooded

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<th>PN</th>
<th>Name</th>
<th>Depth</th>
<th>Volume</th>
<th>Flow / Overflow</th>
<th>Pipe Cap.</th>
<th>Flow (l/s)</th>
<th>Status</th>
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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

<table>
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<th>PN</th>
<th>US/MH</th>
<th>Name</th>
<th>Depth (m)</th>
<th>Volume (m³)</th>
<th>Flow / Cap. (l/s)</th>
<th>Overflow Flow (l/s)</th>
<th>Status</th>
<th>Exceeded</th>
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Appendix I  Drainage Strategy Drawing
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN UNLESS NOTED OTHERWISE.

3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.

4. THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY PREPARING WORK.

5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.

LEGEND

- SITE BOUNDARY
- OIL SEPARATOR
- PROPOSED GEOCELLULAR STORAGE
- EXISTING SOIL SEWER
- EXISTING SURFACE SEWER
- EXISTING MANHOLE
- PROPOSED SURFACE CARRIER PIPE
- PROPOSED PIPEWORK
- PROPOSED DRAINAGE CHANNEL
- EXCEEDANCE FLOW

PRELIMINARY

WASTE TRANSFER STATION, DAVENTRY

PROPOSED DRAINAGE LAYOUT
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN UNLESS NOTED OTHERWISE.
3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY PROPOSAL OR WORK.
5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.

LEGEND

CATCHMENT AREAS

<table>
<thead>
<tr>
<th>MANHOLE NUMBER</th>
<th>CATCHMENT COLOUR</th>
<th>AREA</th>
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<tbody>
<tr>
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<tr>
<td>S2</td>
<td>Orange</td>
<td>1019m²</td>
</tr>
<tr>
<td>S3</td>
<td>Purple</td>
<td>1606m²</td>
</tr>
<tr>
<td>S4</td>
<td>Pink</td>
<td>1129m²</td>
</tr>
<tr>
<td>S5</td>
<td>Blue</td>
<td>822m²</td>
</tr>
</tbody>
</table>

Client: A1 Scale

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
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